THE IRON TRADE REVIEW

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Railroads Continue Active Buying of Equipment

Steel Corporation Makes Large Appropriations for Improvements—
Some Low Prices on Cleveland Iron—Better Tone in Coke Market

Great activity in the steel industry continues throughout the country, in spite of a slight improvement in deliveries of finished materials in the east and some weakness in pig iron, scrap and coke which has continued for several weeks without causing depression in other lines. Railroads are extremely busy and show no indication of changing their policy of active buying for equipment and improvements. Large appropriations for improvements are still being made by subsidiaries of the United States Steel Corporation. The American Sheet & Tin Plate Co. will expend about $500,000 in increasing its capacity for high grade sheets and specialties at Farrell, Pa. The American Steel & Wire Co. will enlarge its cold roll and flat wire department at the Cuyahoga plant, Cleveland, where about $600,000 will be expended in installing new mills.

Pig Iron

Pig iron shipments continue heavy and there is no evidence of decrease of melt, but soft spots in the market continue to develop. The buying of re-sale iron at $13, Birmingham, for No. 2 has had a depressing effect on the southern market and quotations on Alabama and Tennessee irons are showing considerable irregularity with a tendency to name $13.50, Birmingham, for No. 2 as the price for delivery throughout the year, although some furnaces are holding for considerably higher prices. Cleveland iron shipped outside of the city has recently been disposed of at very low prices. No. 2 foundry has sold at $17.25, valley, and probably an inquiry for a large tonnage would bring out a $17 quotation. Rumors of sales aggregating 50,000 tons of pig iron in the Buffalo district have not been confirmed.

Railroad Buying

The Carnegie Steel Co. has taken the order for the steel material for 4,500 cars, to be built by the Norfolk & Western in its own shops at Roanoke. From 60,000 to 70,000 tons of steel will be required. Heavy buying of street and interurban rails has appeared at a somewhat earlier date than usual. The Lorain Steel Co., during the week, booked 11,000 tons, including a tonnage for California. The standard rail bookings of the Steel Corporation during the week totaled 24,000 tons, the largest order being 5,000 tons for the Chicago & Eastern Illinois. The Boston & Maine has revived an old inquiry and is expected to close soon for from 3,500 to 4,000 cars. The American Coast Line has placed an order for 1,000 hoppers and 300 flat cars with the Barney & Smith Car Mfg. Co.

Plates

Booth & Flynn, Pittsburgh, have been awarded the contract at Newark, N. J., for the Passaic Valley sewer, which will require 18,000 tons of plates for riveted steel construction. The Carnegie Steel Co. has taken an order for 15,000 tons for the new battleship, Pennsylvania, which will be built by the Newport News Ship Building Co. This tonnage is exclusive of armor plate.

Coke

Weakness in coke has continued, but there is now some indication of improvement in demand. It is understood that some furnace coke has been sold as low as $2.25 during the past week. There is at present a wide spread between furnace and foundry grades, prices of the latter being well maintained at $3.50 to $4.

Scrap

The old material market is showing increased activity in the Cleveland district, but in other sections of the country, there is no improvement, and in the Philadelphia district, there have been further declines in prices.

Cast Iron Pipe

Requirements of South American Republics for cast iron pipe are attracting much attention. Buenos Ayres recently made a contract for 250,000 tons, covering a period of five years, with makers in Scotland. Cities in Brazil will soon be in the market for from 30,000 to 40,000 tons of pipe. The United States Cast Iron Pipe & Foundry Co. has taken 2,600 tons for Worcester, Mass., and 750 tons for Beverley. Atlantic City is in the market for 2,200 tons, Hartford for 1,500 and Toronto for 3,600.

AMERICAN MILLS

For New Australian Steel Works.—Plans Prepared Here.

Plans have been prepared in this country and construction work has been inaugurated upon a new steel works and rail and structural mill to be erected at New Castle, New South Wales, by the Broken Hill Proprietary Co. James B. Ladd, 1412 Mutual Life Insurance Co. building, Philadelphia, is the American engineer for the new works and has supervised the preparation of the plans. As proposed the works will consist of one blast furnace of 350 tons daily capacity, three 50-ton open hearth furnaces, a 40-inch blooming mill and a 28-inch rail mill adapted to the rolling of structural shapes. Provision is made for three additional blast furnaces and corresponding steel works and finishing capacity, which will be built as required. At the start, however, the output will be limited to rails and structural shapes for which the country offers attractive market possibilities, since large tonnages are now imported annually.

The Broken Hill Proprietary Co., which will erect the works, is controlled by English capitalists and has been active for years in developing the silver, zinc and lead mines of the locality. Large iron ore, limestone and coking coal deposits are held by the company in easy proximity of the location selected for the new works.

David Baker, formerly a member of the engineering firm of Ladd & Baker, Philadelphia, has severed his connection with that firm to devote his permanent attention to the new steel plant. Mr. Baker is now en route to New South Wales, where he will superintend the construction of the works which when completed, will be under his general management. It is planned to install American mills and equipment in the new works and bids are now being taken on these requirements.

Prices of Manganese Ore

The following schedule has been issued of prices which will be paid per ton of 2,240 pounds for domestic manganese ore delivered at Lucy furnace, Carnegie Steel Co., Pittsburgh; Edgar Thomson furnaces, Carnegie Steel Co., Bessemer, Pa., or South Works, Illinois Steel Co., South Chicago, Ill.

For ore containing above

Forty-nine per cent metallic manganese, 25 cents per unit.

Forty-six to 49 per cent metallic manganese, 24 cents per unit.

Forty-three to 46 per cent metallic manganese, 23 cents per unit.

Forty to 43 per cent metallic manganese, 22 cents per unit.

Prices are based on ores containing, not more than 8.00 per cent silica, not more than 0.20 per cent phosphorus, and are subject to deductions as follows:

For each 1 per cent in excess of 8 per cent silica, there shall be a deduction of 15 cents per ton, fractions in proportion.

For each 0.02 per cent, or fraction thereof, in excess of 0.20 per cent phosphorus, there shall be a deduction of two cents per unit of manganese per ton.

Ore containing less than 40 per cent manganese, or more than 12 per cent silica, or 0.225 per cent phosphorus, subject to acceptance or refusal, buyer's option.

Settlements are based on analysis of sample dried at 212 degrees Fahr.

The percentage of moisture in the sample as taken to be deducted from the weight.

Prices subject to change without notice, unless otherwise specially agreed upon.

CONVICTED PRESIDENT

Will Preside at National Convention of Structural Iron Workers.

Indianapolis, Feb. 17.—Frank M. Ryan, president of the International Association of Bridge and Structural Iron Workers, and who was sentenced to seven years in prison at the recent dynamite trial in this city, will preside at the international convention of the organization to be held here beginning Feb. 24. This will be the first international meeting in 18 months, the 1912 meeting having been interrupted by the dynamite trial.

Ryan, recently released from prison on $70,000 bond, is again at the international headquarters here, and apparently again has charge of the organization. Since his return from prison, no newspaper man has seen him; he keeps himself confined to his private office. Joseph E. McClory is serving as acting secretary, temporarily succeeding Herbert S. Hockin, who pleaded guilty in the dynamite trial and therefore could not take an appeal or obtain release on bond.

No word has come from the international headquarters as to whether or not Ryan and other convicted officers of the association will stand for re-election, or whether the organization will insist that they again accept office.

Some of the conservative labor organizations, in their official publications, have urged the iron workers to not re-elect their convicted officers. Samuel Gompers, president of the American Federation of Labor, will attend the convention next week.

NICKEL PROPERTIES

Of Dominion Nickel Co. Are Purchased by a Syndicate.

The extensive holdings of nickel properties in the Sudbury district, of the Dominion Nickel Co., owned by J. R. Booth, of Ottawa, and M. J. O'Brien, of Renfrew, Ont., have been purchased by a syndicate headed by Dr. F. S. Pearson, a well known Canadian financier, in which the Rothschilds, of Paris, are stated to be heavily interested. The purchase price is understood to be about $9,000,000. The Dominion Nickel Co. has for many years held large nickel producing areas and last year acquired the Northern Nickel range from the Lake Superior Power Co. and took over the Murray mine, in which the amount of ore in sight is estimated at 500,000 tons. It controlled practically all the nickel lands in the district of known value, with the exception of the holdings of the Canadian Copper Co. and the Iron & Nickel Co. Latterly there has been keen competition for nickel properties owing to the increased demand for nickel, and both the International Nickel Co. and the Guggenheims were for some time in negotiation to buy out the Dominion Nickel Co., but did not offer satisfactory terms.

The French Rothschilds who hold extensive nickel concessions in New Caledonia, find themselves unable to compete successfully with the International Nickel Co. which has practically a monopoly of the Sudbury output, as the Sudbury ore is superior both in grade and extent to that of New Caledonia, and consequently decided to enter the Canadian field. The outlay required to put the syndicate on a satisfactory footing is estimated at between $5,000,000 and $8,000,000.

All Will Have Chance

An item published in THE IRON TRADE REVIEW of Feb. 13, stating that the new mills of the Otis Steel Co., Cleveland, would probably be built by the United Engineering & Foundry Co., Pittsburgh, has caused an erroneous impression in some quarters. Information comes from the Otis Steel Co. that the United Engineering & Foundry Co. has been engaged to give the Cleveland company preliminary plans and estimates of cost, but will not be in a position to have any undue advantage over other builders of steel works equipment. Every part of the plant will be ordered and bought by the Otis Steel Co. after competitive bids have been received.

BID ON BIG JOB

Cleveland Company Would Furnish Cranes for Panama Canal.

The Wellman-Seaver-Morgan Co., Cleveland, recently submitted to the government a bid for furnishing two 250-ton floating cranes to be used in the Panama canal. The Cleveland company is the only American company soliciting the work of furnishing this equipment, while one German and one English manufacturer have entered bids. The contracts for the work, which will probably exceed $1,000,000, have not yet been awarded.

The stockholders of the Wellman-Seaver-Morgan Co. held their annual meeting on Tuesday of this week, when the board of directors and official staff were re-elected. W. N. Sawyer is president and general manager. Business during the past year was good, while unfilled orders on the books at the present time are reported to be larger than ever before.

Re-union of American Rolling Mill Salesmen

The annual reunion of the American Rolling Mill Co.'s salesmen was held recently at the home office at Middletown, O. The meeting was for social and educational purposes. From an educational standpoint unusual interest was aroused by the presentation of several new specialties which the company will sell during the year.

The salesmen are most carefully chosen and are required to take a course in mill practice before going on the road in order that they may have complete knowledge of the many specialties manufactured by the company. The complete research department and its corps of efficient engineers are are at the disposal of all this company's salesmen.

Death of Thomas Morris

Theodore Morris, senior member of the firm of Morris, Wheeler & Co., Philadelphia, iron and steel merchants, died at his home in that city, Saturday, Feb. 15. His age was 73 years. He had not been in the best of health for some months, but his illness did not become serious until a few days before his death. Mr. Morris for many years had occupied a prominent position as an iron and steel merchant of Philadelphia and had been associated with Morris, Wheeler & Co. for more than 50 years. At one time, he was associated in the operation of the old Pottstown Iron Works, Pottstown, Pa., but had never been active in its management. He was a native of Philadelphia.

MONTHLY BULLETIN

Of the American Iron and Steel Institute Makes Its Appearance.

The first issue of the monthly *Bulletin* of the American Iron and Steel Institute is well printed and elaborately illustrated. It has 32 pages, 7 x 10 inches, with a cover. The leading article is on model yard conditions at the Bethlehem company works, by Dr. Thomas Darlington, secretary of the welfare committee of the institute. Samuel H. Chauvenet, manager of the Berkshire Iron Works, Sheridan, Pa., discusses the use of Portland cement in the hearth and bosh of the Sheridan blast furnace, and Charles L. Close, manager of the bureau of safety, relief, sanitation and welfare of the United States Steel Corporation, tells of the work of committees on safety and sanitation of the Steel Corporation. He says that as a result of the safety work, serious and fatal accidents have been reduced 43 per cent since 1906. On the basis of a normal pay roll of 200,000 employes, this means that each year over 2,300 employes now avoid fatal or serious injuries who would have been injured under conditions existing in 1906. Special attention has been given to the purification of drinking water and all plants are being equipped with good drinking water systems. The committee is now working on standards for the equipment of toilets and within a short time certain general requirements as to specifications will be sent to all companies. During the year of 1911, the subsidiary companies of the Steel Corporation expended $750,000 in safety work and $1,250,000 in sanitation work. Figures for 1912 are not fully compiled, but it is known that they will greatly exceed those of 1911.

James T. McCleary, who will be editor of the *Bulletin*, assisted by Dr. Darlington and Howard H. Cook, announces that it is designed to be statistical, scientific and altruistic in its purposes. That the new editor, like James M. Swank, is appreciative of the higher things of life is shown by his tribute to Mr. Swank, by his little editorial on "Faith," and by other features of the *Bulletin*, which promises to be a valuable addition to publications connected with the iron trade.

FIRST ELECTION

By Mining Engineers Under New Plan—Important Meeting.

Owing to the interest manifested in the production of sound steel ingots and the accompanying elimination of defects which today results in a heavy discard of most of the steel produced, the annual meeting of the American Institute of Mining Engineers, which opened at the Engineering Societies' building, New York, Tuesday morning, promises to be the most important in the history of this organization.

At the opening session, a new constitution was adopted which provides for the future government of the institute by one body instead of by a board of directors and council, as heretofore. The committee which prepared the new plan and rules for governing this society consisted of Joseph W. Richards, chairman; Chas. Kirchhoff and Charles F. Rand.

The constitution provides that the business of the institute shall be managed by a board of directors elected annually by letter ballot and shall consist of a president, two past presidents, six vice presidents and 15 directors. At the first meeting of the board after the annual meeting of the institute, a first vice president is to be elected from among the vice presidents; a secretary who may or may not be a member of the board and a treasurer from among the members of the board of directors.

The first election under the new plan resulted as follows:

President, Charles F. Rand, president of the Spanish-American Iron Co., New York City.

Past presidents, Charles Kirchhoff and James F. Kemp.

Vice presidents: Karl Eilers, W. Lindgren, B. B. Thayer, J. J. Jennings, T. H. Leggett and F. W. Denton.

Directors: W. J. Olcott, C. S. Robinson, E. L. Young, J. A. Holmes, John H. Janeway Jr., J. W. Finch, J. W. Richards, E. P. Mathewson and L. D. Ricketts.

Capt. Robert W. Hunt and James Gayley were elected directors to fill the unexpired term of Charles F. Rand and James F. Kemp.

The holdover directors follow: Dr. James Douglas, Dr. A. B. Lidoux, E. B. Kirby and G. C. Stone.

The British Columbia Transport Co. will build a brick plant at New Westminster, N. B., during the spring. Oil-burning kilns will be used.

PITTSBURGH

Some Low Prices, But Outlook Good

Office of THE IRON TRADE REVIEW,
2148-49 Oliver Bldg., Feb. 18.

Several iron and steel manufacturers advise that specifications against contracts the last week or ten days have fallen off slightly, although others report that there is no let-up in demand. Overcrowded and congested mills gladly welcome decreased demand at this time, to allow them to catch up on badly deferred deliveries. All mills in this district have sold practically their entire outputs through the first half of the year and some have taken contracts extending through the entire year.

Although lower quotations characterize several grades of pig iron this week, it cannot be conscientiously said that the market is weak. Basic appears to be established at $16.35, which is 15 cents under the market of 10 days ago, and foundry and malleable irons are selling at about 25 cents a ton less than they brought a short time ago. Lower quotations are the result of sales made by some blast furnace interests that have been able to accumulate surplus tonnages. Scarcely enough tonnage has been sold, however, to either break or make the market.

The coke market is extremely quiet. Slightly lower quotations are prevailing, but there seems to be increased demand for strictly high quality fuel, which is expected to steady the market and possibly bring out advanced prices. The scrap market is decidedly dull and weak.

Pig Iron. — Several grades of pig iron are quoted at slightly lower prices this week, and yet the general market continues strong. The blowing in of a furnace some time ago at West Middlesex, O., threw considerable surplus foundry iron on the market, and some sellers of basic and malleable have been willing to offer iron at slightly less than the market of a week or two ago. Lower prices, it is believed, are the result of a prolonged period of quiet and inactivity. No. 2 foundry has sold at $17.25, valley, and it is not at all improbable that a large inquiry would bring out a $17 quotation. Consumers, however, do not seem inclined to buy beyond July 1. The Colonial Steel Co.'s purchase a week ago indicates that standard basic is not above $16.35, valley, and according to expression heard in some quarters, $16.25, valley, represents the basic market. Within the last two weeks, one of the malleable consumers in this territory obtained a fairly large tonnage at $17, valley, although sales have been made this week at $17.25. The American Steel Foundries entered the market a few days ago for 2,000 tons of basic, but has since withdrawn. It is reported that one of the local steel companies expects to figure in the market shortly for basic pig iron. With ore bringing higher prices and with coke selling at about the price at which consumers covered first half requirements, many in the trade expect to see pig iron quotations advance when second half needs are purchased. We quote all grades for first half delivery as follows:

(First Half.)

Bessemer, valley	$17.25 to 17.50
Bessemer, Pittsburgh	18.15 to 18.40
Basic, valley	16.35
Basic, Pittsburgh	17.25
No. 2 foundry, valley	17.25 to 17.50
No. 2 foundry, Pittsburgh	18.15 to 18.40
Malleable, valley	17.25 to 17.50
Malleable, Pittsburgh	18.15 to 18.40
Gray forge, valley	16.25 to 16.50
Gray forge, Pittsburgh	17.15 to 17.40

Ferro-Alloys.—The market for ferro-alloys is decidedly quiet, dealers advising that there is no demand for either prompt or forward material. Ferro-manganese appears to be rather firm at $65, seaboard, for either prompt or future shipment, and 50 per cent ferro-silicon is being held at $75, Pittsburgh.

We quote 80 per cent ferro-manganese at $65, Baltimore, for prompt delivery and $65 for forward shipment. The freight rate from Baltimore to Pittsburgh is $1.95 per ton.

Fifty per cent ferro-silicon is quoted at $75, Pittsburgh, for prompt and forward delivery; 12 to 13 per cent, $25 to $26, 11 to 12 per cent, $24 to $25; 10 to 11 per cent, $23 to $24; 9 to 10 per cent, $22 to $23, f. o. b. Globe, Jisco and Ashland furnaces. The freight rate to Pittsburgh is $1.90. The foreign grades are held at $1 or more a ton over domestic prices.

On ferro-titanium we quote 8 cents per pound for carload lots; 10 cents per pound for 2,000 pound lots and over, and 12½ cents per pound in lots up to 2,000 pounds.

Plates.—The Jones & Laughlin Steel Co. continues to offer steel plates and structural shapes at 1.50c for delivery after July 1, and several other mills are selling for second half delivery at 1.55c and as high as 1.60c is quoted by some interests for forward delivery. The Carnegie Steel Co.'s maximum price for shapes and plates is 1.45c. Plate mills are well equipped with orders, and consumers are urging deliveries. No large orders for cars have been placed by railroads in this district since the Pennsylvania lines west figured in the market. It is understood that the Baltimore & Ohio is considering the purchase of more than 4,000 cars. Demand for prompt material has not fallen off. We quote:

Standard steel plates ¼ inch thick, 6¼ to 100 inches, 1.45c to 1.60c for forward shipment and 1.65c to 1.90c for prompt shipment. For extras, see card of Sept. 1, 1909.

Sheets.—There has been no let-up in the demand for all grades of steel sheets, and specifications appear to be to the full extent of contracts in all instances. None of the larger sheet makers is in a position to sell additional tonnage for delivery during the first half of the year, and it is understood that several consumers have been able to cover needs through the entire year. Mills, as a general rule, however, are declining to quote beyond the end of the third quarter. Several mills, able to offer material for rather prompt delivery, are enjoying premiums, ranging from $1 to $4 a ton, and it is stated that demand for material to be delivered within two or three weeks has not fallen off. All of the sheet mills are running at maximum capacity, although complaint continues to be heard about the scarcity of raw material. No. 10 gage blue annealed sheets are quoted at $1.75, No. 28 gage black $2.35, No. 28 gage galvanized, $3.50. Complete quotations follow:

Flat Sheets

Black Sheets.—Nos. 10-12 gage, $2 per 100 pounds; Nos. 13-14 gage, $2.05; Nos. 15-16 gage, $2.10; Nos. 17-21 gage, $2.15; Nos. 22-24 gage, $2.20; Nos. 25-26 gage, $2.25; No. 27 gage, $2.30; No. 28 gage, $2.35; No. 29 gage, $2.40; No. 30 gage, $2.50.

Tin mill sizes, Nos. 15-16 gage, $2.10 per 100 pounds; Nos. 17-21 gage, $2.15; Nos. 22-24 gage, $2.20; Nos. 25-27 gage, $2.25; No. 28 gage, $2.30; Nos. 29-30 gage, $2.35; Nos. 30¼-31 gage, $2.40; No. 32 gage, $2.45.

Blue Annealed.—Nos. 3-8, $1.70 per 100 pounds; Nos. 9-10, $1.75; Nos. 11-12, $1.80; Nos. 13-14, $1.85; Nos. 15-16, $1.95.

Galvanized.

Nos. 10-11 gage, $2.50 per 100 pounds; Nos. 12-14 gage, $2.60; Nos. 15-16 gage, $2.75; Nos. 17-21 gage, $2.90; Nos. 22-24 gage, $3.05; Nos. 25-26 gage, $3.20; No. 27 gage,

$3.35; No. 28 gage, $3.50; No. 29 gage, $3.65; No. 30 gage, $3.80.

Roofing Sheets

Net extras on all gages per 100 pounds. Corrugated 2-inch, 2½-inch, 3-inch and 5-inch corrugation, 5c; 2 V crimped without sticks, 5c; corrugated 1¼-inch corrugation, 10c; 3 V crimped without sticks, 10c; pressed standing seam with cleats, 15c; plain roll roofing with or without cleats, 15c.

Painted Roofing.

12 to 18 gage, inc., 5c; 19 to 24 gage, inc., 10c; 25 to 28 gage, inc., 15c.

Tin Plate. — Specifications for tin plate continue to come in at a heavy rate, although there has been practically no new buying this month, inasmuch as consumers covered requirements some time ago. Some tin plate makers declare that the present $3.60 base price is not sufficient to afford profits of any size, although there is no indication of any change being made in the prevailing price. We quote:

Coke tin plate, 100-pound basis, 14 x 20, $3.60, f. o. b. mill, Pittsburgh district.

Rails and Track Material.—There has been an especially large number of small orders for rails received by mills in this district during the past week or ten days. Although none of the single orders were large, they represent rather heavy tonnages in the aggregate. The light rail trade continues strong, and a heavy demand is reported. Traction line companies are figuring more conspicuously in the buying movement, and it is probable that a number of good orders will be placed by these interests in the near future.

Inasmuch as consumers of spikes covered requirements some time ago, there has been no new buying the last two or three weeks. Spikes are quoted at 1.90c and 2c is being asked for smaller sizes. Rails are quoted as follows with the base price of open hearth steel sections at 1.34c per pound at the mill.

Fifty-pound and heavier, 1.25c per pound; carload and less than 500 tons, 1.34c per pound; light rails on base weight of 40 to 45 pounds, 1.25c, the schedule on the other weights being irregular and subject to negotiations; angle bars for standard sections, 1.50c, base, Pittsburgh; track bolts, 2.40c to 2.50c, base, Pittsburgh.

Railroad Spikes

4½, 5 and 5½ and 9-16	1.90c
3, 3½, 4, 4½ and 5 x ½	.10
3½, 4 and 4½ x 7-16	.20
3, 3½, 4 and 4½ x ⅜	.30
2½ x ⅜	.40
2½, 3 and 3½ x 5-16	.60
2 x 5-16	.80

Billets and Sheet Bars.—The market for raw material has been quiet the last couple of weeks, and no sales of any consequence are reported in this district. The scarcity of billets and sheet bars is evidenced by the fact that several anxious consumers say there is no available tonnage in any part of the country. An occasional sale of a small tonnage is reported, and quotations which are given herewith do not appear to be high when based upon actual transactions. We quote as follows:

Bessemer 4 x 4 billets with 0.25 carbon and less are quoted at $29.00, with the usual rolling billets, $29.50. Bessemer sheet and tin bars are quoted at $29.50 and open-hearth sheet bars are quoted $30, f. o. b. Pittsburgh and Youngstown, with full freight to destination added. Forging billets are quoted at $36, Pittsburgh.

Hoops and Bands. — Demand for hoops and bands continues at a heavy rate, although new business is not so heavy as it was a month or so ago. Shipments are being urged, and all the hoop and band mills are operating at capacity. Hoops are quoted at 1.60c to 1.70c, and bands at 1.40c.

Hoops in carload lots, 1.60c to 1.70c, Pittsburgh, in less than carload lots, 1.65c to 1.75c; bands, 1.40c, base, with net extras, as per standard steel.

Merchant Bars.—The bar market is quiet, and, inasmuch as heaviest consumers covered requirements through the first half of the year, and in some instances the entire year, it is not probable that any great activity will be experienced for some time. Specifications against contracts are coming in at a heavy rate, and some mills advise that specifying this month exceeds that of last.

Iron bars continue to be quoted at a rate from 1.70c to 1.80c, and fairly good new demand is reported. The shafting market is quiet. There is not much of any new buying, although that which has been done has been at the advanced quotations that went into effect several weeks ago. Shafting is quoted at 58 per cent off for carload lots and 53 per cent off for less than carload lots.

Common iron bars, 1.70c to 1.80c, Pittsburgh; Bessemer and open-hearth steel bars, 1.40c; plow and cultivator 1.40c; channels, angles, zees, tees, under 3 inch, 1.50c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds and not less than 1,000 pounds of a size, 0.15 advance, less than 1,000 pounds of a size, 0.35. Cold rolled and ground shafting, 58 per cent off in carloads and 53 per cent in less than carloads delivered in base territory.

Muck Bar.—No change is noted in the muck bar market. Consumers covered requirements several months ago, and no new sales are reported. We quote muck bar nominally at $32, Pittsburgh.

Bolts, Nuts and Rivets.—Quotations for bolts, nuts and rivets in this district are being firmly maintained, and manufacturers report a good demand. Shipments are badly deferred, and mills have not been able to catch up on deliveries this year. Quotations are as follows:

Rivets

Button head structural rivets, 2.20c, cone head boiler rivets, 2.30c. Small rivets 75, 10 and 10 off.

Bolt and Nut Discounts.

Carriage bolts, ¾ x 6 inches, smaller and shorter, rolled threads, 75 and 10; cut threads 75 and 5; larger and longer, 70 and 2½.

Machine bolts with hot pressed nuts, ¾ x 4 inches, smaller and shorter, rolled 75, 10, and 5; cut, 75 and 10; larger and longer, 70 and 7½.

Gimlet and cone point lag or coach screws, 80 and 10.

Hot pressed square, blank or tapped nuts, $5.70 off list; hot pressed hexagon blank or tapped, $6.30.

Cold pressed C. & T. square, blank or tapped, $5.70 off; hexagon, blank or tapped, ⅝-inch and larger, $6.60 off; ½-inch and smaller, $7.20 off.

Structural Shapes.—What has been said in reference to mills selling steel plates also applies to structural shapes. The McClintic-Marshall Construction Co. has taken 927 tons for a bridge for the Pittsburgh & Lake Erie railroad at West Ellwood, Pa., and 144 tons for a foot bridge to be built by the same road at Woodlawn, Pa. The Cambria Steel Co. has taken 7,000 tons for an armory building at New York City, and the Pittsburgh Bridge & Iron Co. about 200 tons for a new building for the Bell Telephone Co., at Erie, Pa. Prices for forward shipment are:

Standard structural shapes, 1.45c to 1.60c for forward shipment. For extras see card of Sept. 1, 1909.

Iron and Steel Pipe. — Although there are not many large inquiries pending for iron and steel pipe, manufacturers advise that small orders have been exceedingly numerous and represent heavy tonnages in the aggregate. Pipe mills are in as good a position as ever before in the history of the trade, according to some makers. Demand for oil country goods has been especially heavy, and it is understood that some of the recent purchasers will again figure in the market this month. Mills are figuring on an inquiry for 60 miles of 8-inch lap weld pipe for California shipment. Discounts to jobbers, which are subject to the usual preferential discount to the large buyer, are as follows:

Iron and Steel Pipe Basing Prices

STEEL.

	Black. Butt.	Galv. Butt.	Black. Lap.	Galv. Lap.
⅛, ¼ and ⅜ inch	73	52½	..	..
½ inch	77	66½	..	..
¼ to 3 inch	80	71½	..	..
2 inch	..	..	77	68½
2½ to 6 inch	..	..	79	70½
7 to 12 inch	..	..	76	65½
13 to 15 inch	..	..	53	..
Extra Strong Plain Ends, Card Weight.				
⅛, ¼ and ⅜ inch	68	57½	..	..
½ inch	73	66½	..	..
¾ to 1½ inch	77	70½	..	..

2 to 3 inch	78	71½	..	....
2 inch	..	..	74	65½
2½ to 4 inch	..	..	76	67½
4½ to 6 inch	..	..	75	66½
7 to 8 inch	..	..	68	57½
9 to 12 inch	..	..	63	52½

Double Extra Strong Plain Ends, Card Weight.

½ inch	63	56½	..	..
¾ to 1½ inch	66	59½	..	..
2 to 2½ inch	68	61½	..	..
2 inch	..	..	64	57½
2½ to 4 inch	..	..	66	59½
4½ to 6 inch	..	..	65	58½
7 to 8 inch	..	..	58	47½

IRON.

⅜ inch	66	47	..	..
½ inch	70	57	..	..
¾ to 2½ inch	73	62	..	..
2 inch	..	..	69	59
2½ to 6 inch	..	..	71	62
7 to 12 inch	..	..	69	56

Extra Strong Plain Ends, Card Weight.

⅜ inch	64	53	..	..
½ inch	68	61	..	..
¾ to 1½ inch	72	63	..	..
2 and 2½ inch	73	64	..	..
2 inch	..	..	67	59
2½ to 4 inch	..	..	71	62
4½ to 6 inch	..	..	70	61
7 to 8 inch	..	..	64	54
9 to 12 inch	..	..	59	48

Double Extra Strong Plain Ends, Card Weight.

½ inch	58	50	..	..
¾ to 1½ inch	61	53	..	..
2 and 2½ inch	63	55	..	..
2 inch	..	..	56	50
2½ to 4 inch	..	..	61	55
4½ to 6 inch	..	..	60	54
7 and 8 inch	..	..	53	43

Plugged and reamed pipe is furnished at 2 points higher price either butt or lap weld.

The above discounts are for full weight pipe, subject to a variation of 5 per cent, merchant pipe, when specified, being furnished up to 6 inches at one point higher discount (lower price).

Boiler Tubes.—Specifications against contracts for both iron and steel boiler tubes have been especially heavy, and there has been considerable buying of tubes on the part of makers of locomotive boilers. Steel boiler tube discounts that went into effect Feb. 1 are being firmly maintained.

IRON AND STEEL BOILER TUBES BASING PRICES.

(To Jobbers.)

	Steel.	Iron.
1¼ to 2 inch	60	48
2¼ inch	57	44
2½ and 2¾ inch	63	53
3 and 3¼ inch	68	55
3½ to 4½ inch	70	58
5 and 6 inch	63	..
7 to 13 inch	60	..

To destination east of Mississippi river will be sold at delivered discount for carloads lowered by 2 points, for lengths 22 feet and under; longer lengths, f. o. b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.

Wire.—Specifications against contracts have been fairly heavy, and some new demand is reported by manufacturers of wire products. There has been no change in quotations, although one of the local interests, which has been practically out of the market for some time, has advanced quotations $1 a ton to discourage new business. Nearly all of the tonnage taken below $1.70 for the base price of nails has been shipped, and some mills are filling orders taken at $1.75. We quote as follows:

Wire nails, jobbers' carload lots, $1.75, retailers' carload lots, $1.80; cut nails (western makers), jobbers' lots, $1.70; painted barb wire, jobbers' carload lots, $1.75; retailers' carload lots, $1.80, with 40c for galvanizing; plain wire to jobbers in carloads, $1.55; and to dealers, in carloads, $1.60; polished staples, $1.75; galvanized staples, $2.15.

Wire Rods.—The market for wire rods is like that for muck bar. Inasmuch as consumers covered requirements sometime ago, there has been little or no new demand. We quote wire rods nominally $30, Pittsburgh, for either Bessemer or open hearth products.

Coke. — Not enough transactions have been made to indicate the exact status of the coke market this week, and quotations are more or less nominal for that reason. It is understood that some coke has been sold at $2.25, ovens, during the past week, although several shippers are declining to sell at less than $2.50, ovens. We quote the market at a range from $2.25 to $2.50. About a week ago, a local blast furnace interest advised that it had obtained a fairly large tonnage of contract furnace coke at $2.50, ovens, which seems to represent the minimum of the contract market. Some dealers declare they would not sell at less than $3 a ton at the ovens.

The sale of ten cars of foundry coke a week to one of the heaviest consumers in this district for delivery the next few months gives a rather clear insight into the future foundry market. Although the exact price at which this transaction closed is not known, it is understood that the price obtained was in the neighborhood of $4 a ton, although it is claimed that some 72-hour coke has sold as low as $3.50, ovens. Prompt foundry is selling at a spread from $3.50 to $3.75.

Shippers of highest quality of fuel report that maximum prices are being obtained without difficulty, and it is known that several consumers have canceled contracts to change their sources of supply. Production continues at a heavy rate. Figures compiled by the Connellsville Courier indicate that the 400,000-ton mark has been passed five times during the first six weeks of the year. This mark was not passed a dozen times in 1912. Production for the week ending Feb. 8 was 410,443 tons, a decrease of 12,310 tons, compared with the week before. Shipments decreased 442 cars. The number of active ovens made a net increase of 36 ovens. Revised quotations follow:

Connellsville furnace	$2.25 to 2.50
Connellsville furnace contract	2.50 to 3.00
Connellsville foundry	3.50 to 3.75
Connellsville foundry contract	3.50 to 4.00

Old Material.—A period of inactivity continues to mark the market for old materials. Middlemen have been able to obtain heavy melting steel as low as $14, although so far as can be learned no market sales have been made at less than $14.25. Consumers are well provided and, aside from the heavy tonnages obtained from dealers last fall, have secured considerable material from the various railroads with shops in this section of the country. There has been no demand and some mills have declined to offer more than $14 a ton for material.

Dealers, on the other hand, say that they would refuse to sell a large tonnage at less than $15. When quotations began to advance last fall heavy melting steel was selling at $12.75,—$1.50 a ton less than it is quoted today. Agricultural malleable has dropped 25 cents a ton, and bundled sheet scrap is selling at 75 cents a ton less than it brought a week or so ago. Machine shop turnings are low, and in no demand. Cast borings and No. 1 cast scrap are the only grades to stand up under the slump. Revised quotations follow:

Heavy melting scrap	$14.25
Rerolling rails	16.50 to 17.00
Malleable	14.00 to 14.50
Agricultural malleable	12.75 to 13.00
Bundled sheet scrap	12.00 to 12.25
Iron axles	26.00 to 26.50
Old iron rails	16.25 to 16.50
Stove plate	11.00 to 11.50
No. 1 wrought scrap	15.25 to 15.50
Old car wheels	16.00 to 16.50
Low phosphorus	18.00 to 18.25
Machine shop turnings	10.00 to 10.50
No. 1 busheling	14.00 to 14.50
Country mixed	10.75 to 11.00
Cast borings	10.25 to 10.50
No. 1 cast scrap	14.75 to 15.00

Will Move to Pittsburgh

From a reliable source it is learned that spelter works now located in Oklahoma, shortly will be moved to the Pittsburgh district where large smelters will be erected for the manufacture of spelter and the production of sulphuric acid. The cost of the plant is estimated at $5,000,000. Construction will be started at an early date, one in close touch with the proposed plant announces. Detailed plans are not given out at this time.

The Wilmington plant of the American Car & Foundry Co. has received an order from the government railways of Chili for a large amount of passenger equipment of various type. The order calls for 17 sleeping cars and numerous other coach types.

CHICAGO

Mills Receive Inquiries From the East

Office of THE IRON TRADE REVIEW,
1328 Monadnock Blk., Feb. 18.

A surprising number of inquiries from eastern buyers have been received by the mills in this district. These ask for tonnages of all materials for deliveries throughout this year and in many cases high premiums are offered. The mills find themselves less able to consider this business than they were some time ago, as the volume of specifications received is constantly increasing. One of the largest producers in this territory reports that 50 per cent of the contract tonnage on its books has already been specified. It is estimated that the earliest delivery that can be obtained in this territory on new business is in the neighborhood of October and the delivery situation on specifications is not incomparably better.

Pig Iron.—In spite of a certain dullness in the pig iron market, both sellers and consumers are manifesting a keen interest in the possible outcome of the present situation. A number of inquiries for second half delivery have appeared, which, upon investigation, prove to be in the nature of feelers rather than indications of a disposition to buy immediately. Sales are so scarce as to make quotations nominal, the only ones reported being of various small lots for immediate delivery. No trouble has been experienced, however, in obtaining from $14 to $14.50, Birmingham, for such iron and sales of northern iron of like character are made on a basis of $18, local furnaces.

It is thought in some quarters that a slight indication of increased strength in the market would precipitate a buying movement and it is certain that any indication of the latter would drive prices upward rapidly. Low prices which are still to be obtained from Tennessee furnaces are not bringing many consumers into the market, and on the other hand some of the best informed men in the trade believe that on account of the increased cost of ore and coke, material price reductions would necessarily drive many stacks out of blast. This would naturally tend to give the market renewed strength.

Birmingham producers are still holding at from $14 to $14.50, the former figure being made by only one interest. The only inquiry of interest that is noted is from the Vermillion Malleable Iron Co., asking for from 500 to 1,000 tons of malleable Bessemer for delivery over the third quarter.

The following prices represent the market for Chicago delivery except northern foundry and malleable Bessemer, which are quoted f. o. b. local furnaces:

Lake Superior charcoal	$18.00 to 19.25
Northern foundry No. 2	17.50 to 18.00
Southern foundry No. 2	17.85 to 18.85
South'n Silveries, 5 per cent sil.	19.85
Jackson co. silveries 8 per cent	21.90
Malleable Bessemer	18.00
Alabama basic	18.85

Merchant Bars. — The period for the delivery of bar iron remains unchanged except that the relief experienced by the mills is not so great as was expected. Although specified material can be obtained in about six weks, that delivery on new business brings a considerable premium. Makers of steel bars are still flooded with specifications and the tonnage available in this territory for the remainder of the year is estimated as being very small. The market for hard steel bars is very firm, but the increase in the available tonnage of re-rolling rails has relieved producers of a considerable burden.

We quote f. o. b. Chicago as follows:

Bar iron 1.60c to 1.62½c; hard steel bars, rerolled, 1.65c to 1.75c; soft steel bars, bands and small shapes, 1.63c; hoops, 1.63c; smooth finished machinery steel, 1 inch and larger, 1.78c; shafting 58 per cent off list for carload lots, 53 per cent off for less than carloads.

On iron and steel from local stock we quote as follows:

Bar iron, 1.95c per pound base; soft steel bars, 1.95c per pound base; soft steel hoops, 2.30c, full extras.

Structural Material.—Shapes appear to be in greater demand than any other finished material and although the mills in this territory are full for the ensuing year, the activity of fabricators is unceasing. While the contracts placed during some weeks show a small total, a good average is being maintained. During the past week, contracts covering 9,070 tons of structural material were placed, the largest of which was for 3,000 tons taken by the Colorado Fuel & Iron Co. for pipe bands at Portland, Ore. The Minneapolis Steel & Machinery Co. has taken 2,170 tons for the Davenport Hotel, Spokane, Wash. The leading interest has taken 1,138 tons for the Stewart Apartments, Division and Lake Shore Drive, Chicago. The same fabricator has also taken 136 tons from the Chicago & Northwestern Railway Co. for two 95-foot turntables at Peoria, Ill., and 904 tons for the Deardorff building, Kansas City, Mo. The Ralston Iron Works has taken 368 tons for the residence of E. Templeton Crocker at San Mateo, Cal., and the J. I. Case Threshing Machine Co. has let a contract for 970 tons for the construction of a power house at Racine, Wis., to the Kenwood Bridge Co. The Chicago Steel Products Co. has taken 275 tons for the Roosevelt-Mesa Transmission Line on the Salt river project, Arizona. The Centralia Pump & Water Power Co. has let a contract for 109 tons of shapes for the erection of its hydro-electric plant at Grand Rapids, Wis.

We quote f. o. b. Chicago, as follows:

Beams and channels, 15 inch and under, 1.68c. For extras, see Pittsburgh report.

Store prices are as follows:

All angles, 3 inches and larger, including 6 inches, $2.05 per 100 pounds; angles over 6 inches, $2.15 per 100 pounds, base; beams, 3 to 15 inches, inclusive, $2.05 per 100 pounds, base; channels, 3 inches and larger, $2.05 per 100 pounds, base.

Rails and Track Fastenings. — The Great Northern Railroad has ordered 15,000 tons of rails from the Illinois Steel Co. and the Waterloo, Cedar Falls & Northern has ordered 7,000 tons of rails from the same makers. It is apparent that the railroad requirements for the current year will be much greater than was anticipated in some quarters, but considerable difficulty is expected in meeting them. Specifications against rail contracts received by the mills in this territory are exceedingly heavy and the movement in track fastenings is at an equal if not greater rate. Prices are, of course,

very firm with strong upward tendencies, the possibility of an advance being governed by the disposition of the mills. Offerings of large premiums are reported for the early delivery of both rails and track fastenings, but western producers are able to do but little to assist the consumers in this regard.

We quote light rails f. o. b. Chicago, as follows:

Light rails, carloads, 25 to 45-pound, 1.30c; 16 to 20-pound, 1.35c; 12-pound, 1.40c; 8-pound, 1.50c.

Light section relayers, 45 pounds and under, subject to inspection, $22 to $24; standard stection relaying rails, subject to inspection.

And track fastenings f. o. b. Joliet, are as follows:

Angle bars, 1.50c; railroad spikes, 1.95c; smaller size spikes, 1.75c, base; track bolts with square nuts, 2.30c to 2.40c.

Plates. — The Missouri, Kansas & Texas is in the market for 1,000 drop bottom stock cars and the Chicago, Rock Island & Pacific has ordered 1,000 box cars from the Western Steel Car & Foundry Co. The Mineral Range has sent out inquiries for 1,000 all-steel rock cars. Railroad requirements in rolling stock seem to be unlimited and the tonnage of steel necessary to fill the requirements of the car builders may cause increased congestion in other lines before the close of the year. As has previously been announced, many car orders have been taken on which delivery will not be made until the early part of 1914. At present, however, the business in this material is fairly well distributed, consumers in other lines taking out heavy tonnages. Specifications are very heavy and there is but little slackening in inquiry.

We quote f. o. b. Chicago, as follows:

Tank plates, ¼ inch thick, 6⅝ to 100 inches wide, 1.68c. For extras, see Pittsburgh report.

Store prices are as follows:

Tank steel, ¼ inch and heavier, up to 72 inches wide, $2.05.

Bolts, Nuts and Rivets.—Although the market for rivets is a little easier, a condition quite welcome to western producers, business in both nuts and bolts is very heavy and some difficulty is being experienced in taking care of current orders.

We quote prices on bolts, nuts and rivets as follows:

Rivets

Structural rivets, ½ to 1¼ inches, 2.38c, base, Chicago, in carload lots; boiler rivets, 0.10c additional.

Bolt and Nut Discounts

Carriage bolts up to ⅜ x 6 inches, rolled thread, 75-13; larger sizes, 70-2½.

Machine bolts, up to ⅜ x 4 inches, rolled thread, 75-10-5; cut thread, 75-10; larger sizes, 70-7½.

Hot pressed nuts, square head, $5.70 off per cwt.; hexagon, $6.30 off per cwt.

Sheets.—This material exhibits the only possible weakness in the market. This is due largely to the fact that independent sheet mills that buy sheet bars are forced to take business in sufficient quantities to consume their raw material, whereas the larger companies having diversified contracts are able to divert their steel to other purposes. One of the larger independent producers in this territory is at present making repairs on alternate ends of its sheet mills without experiencing any difficulty in meeting deliveries. Prices, however, are firm, as the tonnage of steel available for any purpose in this territory is limited.

We quote f. o. b. Chicago, as follows:

Blue annealed, No. 10, 2.25c; No. 12, 2.20c. Box annealed, No. 28, 2.90c. Galvanized No. 28, 4.15c.

For mill prices, see Pittsburgh report. Freight to Chicago, 18 cents.

Wire Products. — Activity in this market continues at an undiminished rate and prices are very firm. Although there has been much talk of higher quotations, no advance has been inaugurated as yet.

We quote f. o. b. Chicago, as follows:

Wire nails, jobbers' carload lots, $1.93; retailers' carload lots, $1.98; retailers' less than carload lots, $2.03; painted barb wire, jobbers' carload lots, $1.93; retailers' carload lots, $1.98; retailers' less than carload lots, $2.03, with 40c for galvanizing; plain wire, jobbers, carload lots, $1.73; retailers' carload lots, $1.78.

Merchant Pipe and Tubes.—Jobbers are being pressed for delivery on this material and while the situation is somewhat relieved as compared with that which existed in the late fall, the usual spring activity will probably put pipe and tube makers considerably behind on deliveries.

We quote f. o. b. Chicago as follows:

Iron and Steel Pipe Basing Prices.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
Butt.				
⅛ inch and ¼ inch.	69.2	48.2	62.2	42.2
⅜ inch	73.2	62.2	66.2	....
½ inch to 1½ inch	76.2	67.2	69.2	57.2
Lap.				
2 inch	73.2	64.2	65.2	54.2
4½ inch to 6 inch..	75.2	66.2	67.2	57.2
Card Weight.				
7 inch to 12 inch...	72.2	61.2	65.2	54.2
Extra Strong Plain Ends.				
Butt.				
⅛, ¼, ⅜ inch.....	64.2	52.2	58.2	46.2
½ inch	69.2	57.2	63.2	51.2
2 inch to 3 inch....	74.2	62.2	....	....
Lap.				
2 inch	70.2	58.2	64.2	52.2
7 inch to 8 inch....	64.2	52.2	58.2	46.2
Double Extra Strong.				
Butt.				
½ inch	57.2	45.2	....	....
¾ inch to 1½ inch.	60.2	48.2	....	....
Lap.				
2 inch	58.2	48.2	....	....
4½ inch to 6 inch..	59.2	47.2	....	....
7 inch to 8 inch....	52.2	40.2	....	....

Tubes

Diameter.	List price.	Lap weld steel, per cent off.	Charcoal iron, per cent off.	Cold seamless, per cent off.
1	30	..	..	57½
1¼	28	..	..	52½
1½	27	..	..	47½
1¾	22	51	40	35
2	20	51	40	35
2¼	22	51	36	35
2½	28	56	43¼	40
2¾	31	56	43¼	40
3	34	61	47	46
3¼	40	61	47	46
3½	43	63	40	46
4	55	63	50	46
5	76	56	..	..
6	102	56	..	..

Cast Iron Pipe.—Bids on the 700 tons of water pipe previously reported as being required by Dayton, O., were closed on Monday. Besides this, however, no large tonnage is in immediate prospect. Some large lots are pending, but financial difficulties are keeping some municipalities out of the market. The usual list of small orders continues in satisfactory volume.

We quote f. o. b. Chicago, as follows:

Four-inch water pipe, $31, 6 to 12 inches, $29, larger sizes, $28, gas pipe, $1 a ton higher.

Old Material.—But one change in scrap quotations has been necessitated during the week, No. 2 railroad wrought being reduced 25 cents a ton. The fact that no further price shading is apparent would seem to indicate renewed strength in the market, but the maintenance is due largely to the absolute quiet which prevails. Consumers in this territory have as large stocks as they can comfortably carry. Prices for delivery in consumers' yards, Chicago, follow:

Gross Tons

Old car wheels	$16.75 to 17.25
Old iron rails	16.25 to 16.75
Rerolling rails (5 ft. and over)	15.50 to 16.00
Old steel rails (3 ft. and und.)	14.25 to 14.75
Frogs, switches and guards	12.50 to 13.00
Heavy melting steel	12.50 to 13.00
Shoveling steel	12.25 to 12.75

Net Tons

No. 1 R. R. wrought	$12.25 to 12.75
No. 2 R. R. wrought	11.25 to 11.75
Arch bars and transoms	16.25 to 16.75
Knuckles, couplers and springs	12.75 to 13.25
Shafting	16.50 to 17.00
Iron car axles	21.50 to 22.00
Steel car axles	18.25 to 18.75
Locomotive tires	13.50 to 14.00
Dealers' forge	10.75 to 11.25
Pipe and flues	9.00 to 9.50
No. 1 cast	13.50 to 14.00
No. 1 busheling	10.25 to 10.75
No. 2 busheling	7.75 to 8.25
No. 1 boiler cut	9.25 to 9.75
Boiler punchings	13.00 to 13.50
Cast and mixed boring	6.75 to 7.25
Machine shop turnings	7.75 to 8.25
Railroad malleable	13.25 to 13.75
Agricultural malleable	12.25 to 12.75
Angle bars, splices, etc., iron	16.50 to 17.00
Angle bars steel	11.50 to 12.00
Stove plate and light cast scrap	11.00 to 11.50

CLEVELAND

Weakness in Pig Iron for Outside Delivery

Office of THE IRON TRADE REVIEW,
Penton Bldg., Feb. 18.

Iron Ore. — The market is at a standstill and somewhat easier conditions in pig iron have not improved the prospects for demand for low grade ores which have not yet been disposed of.

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $4.40; Mesabi Bessemer, $4.15; old range non-Bessemer, $3.60; Mesabi non-Bessemer, $3.40.

Pig Iron.—In spite of the melt of the foundries being well maintained and all iron being taken as fast as the foundries can get it, a rather surprising eagerness for new business has developed among some sellers. While prices on pig iron delivered in Cleveland are being adhered to on a basis of $17.50, furnace, for No. 2 foundry, prices have sagged greatly for delivery outside of the city. A sale of malleable was made at $16.25, furnace, for delivery at Akron, and sales of foundry for delivery to more distant points have been made at $16.50, Cleveland furnace. Sales from near valley furnaces have been made at low prices, but the iron was low in silicon and the furnace is now running on malleable. A number of valley interests continue to sell car load lots at $17.50, valley, for No. 2 foundry. For the first half of this year, we quote as follows, delivered Cleveland:

No. 1 foundry	$18.25
No. 2 foundry	17.75
No. 2 southern	17.85
Bessemer	18.15
Lake Superior charcoal	19.10
Silveries 8 per cent silicon	21.55
Bessemer ferro, 14 per cent	29.55

Coke.—There is very little business being done on either foundry or furnace coke, as the recent decline in prices has not encouraged buyers to place orders. Keen competition of high grade coke selling at low prices is being felt by producers of lower grade coke, who have reduced their quotations to very low levels.

Connellsville furnace coke, $2.35 to $2.50 for prompt delivery, and $2.50 to $2.75 on contract; Connellsville foundry coke, $3.50 to $3.75 for prompt, and $3.75 to $4 on contract.

Finished Material. — Specifications on finished materials are coming in in very large volume and some mills, particularly those in eastern territory, report considerable increase in new business during the past few days as compared with January orders. There has been considerable speculation as to the probable requirements of structural steel for the new plant of the Otis Steel Co., and some estimates place the tonnage at 20,000. While this tonnage may ultimately be required, the company is proceeding cautiously in the development of its plans and is not ready to make any statement as to what its requirements will be. It states, however, that on the building and equipment of its mills there will be absolutely free competition. The Wheeling & Lake Erie railroad has ordered 20 locomotives from the American Locomotive Co., and is in the market for 500 tons of structural material for bridge work. The Goodyear Rubber Co., Akron, O., is making estimates on a building to be erected at Rio de Janeiro, Brazil. The Lake Shore railroad has placed an order for 1,000 kegs of spikes. The present outlook is that agricultural implement concerns will experience considerable difficulty this year in obtaining the concessions on steel bars usually made to them.

Old Material. — Moderate activity has developed in the scrap market, after a protracted lull, and dealers feel more encouraged over the outlook. Prices, nominal for some time past, have been readjusted, and fair business is being done in some grades. Demand for heavy melting steel is fair, sales being made at $12.50 to $13. Inquiries are being made in limited number for No. 1 busheling, which can be sold at the prevailing quotations, $11.50 to $12. No market exists at present for No. 1 railroad wrought, which is very weak. Extremely good demand is being made for first class relaying rails, and dealers are experiencing difficulty in supplying requirements, made principally by industries in this district for added switching and siding trackage. Quotations on this grade have advanced $2 and are now $27 to $28. Stove plate is being received in large quantities by dealers. Being without a market, it is soft. Taken generally, the market shows substantial improvement. The Lake Shore closed a list involving a good sized tonnage Tuesday of this week, and received a satisfactory price for heavy melting steel. Prices on other grades did not establish such a fair standard. The Norfolk & Western closed a list of ordinary tonnage Monday. The embargo against the Upson Nut Co. has been lifted. Revised quotations follow:

Gross Tons

Old iron rails	$15.50 to 16.50
Old steel rails (under 3 ft.)	14.50 to 15.00
Old steel rails (over 6 ft.)	15.50 to 16.50
Relaying rails	27.00 to 28.00
Old steel boiler plate	11.00 to 11.25
Malleable iron (railroad)	14.50 to 15.00
Steel axles	19.50 to 20.00
Axle turnings	10.00 to 10.50
Malleable iron (agricultural)	11.50 to 12.00
Heavy steel	12.50 to 13.00
Country mixed steel	11.00 to 11.50
Bundled sheet scrap	11.00 to 11.50

Net Tons

No. 1 R. R. wrought	$13.00 to 13.25
No. 1 busheling	11.50 to 12.00
No. 1 machine cast	12.50 to 13.00
No. 1 dealers' wrought	10.50 to 11.50
Machine shop turnings	6.50 to 7.00
Pipes and flues	9.00 to 9.50
Wrought drillings	6.50 to 7.00
Cast borings	7.00 to 7.50
Stove plate	9.00 to 9.50
Wrought iron arch bars	17.00 to 17.50
Wrought iron piling plate	16.00 to 16.50

Oglebay, Norton & Co.'s Ore Book

Oglebay, Norton & Co., Cleveland, have issued their ore analyses book for 1913. The list of ores which the firm is offering for sale includes the following new ones: The Carson, Seneca and Susquehanna from the Susquehanna mine of Rogers, Brown & Co., Oxford No. 2 and Risco, which are Republic Iron & Steel Co. properties, and the Cavour, on the Mesabi. The Carson is a coarse hematite, analyzing 50.58 iron natural and 0.039 phosphorus. The Susquehanna analyzes 49.56 iron natural and 0.062 phosphorus. The Seneca analyzes 48.20 iron natural and 0.096 phosphorus. The Cavour is a course hematite from the Buhl district on the Mesabi and analyzes 51.92 in iron natural and 0.073 phosphorus. Oxford No. 2 is a soft Mesabi hematite, analyzing 45.24 iron natural and 0.078 phosphorus. Risco is a coarse Mesabi hematite, analyzing 49.28 iron natural and 0.057 phosphorus. The firm is not offering Antoine, Glyuma and Hobson ores this season.

CINCINNATI

Resale Pig Iron Depresses Prices

Office of THE IRON TRADE REVIEW,
503 Mercantile Library Bldg., Feb. 18.

Pig Iron.—The appearance of more re-sale iron in the southern market has forced the general level of prices 25 cents lower since the first of the week. There are several lots of this grade now being offered at $13, Birmingham basis, mostly for spot or near-by shipment, which condition has been brought about principally because the holders of this iron have been unable to dispose of it at higher prices, and being anxious to move it, are making lower offers in order to induce buying. It is, however, confined mostly to a limited number of makes of No. 2 foundry iron, and contains very little No. 1 or 3 foundry, or any of the other grades. For this reason, therefore, practically the only price affected is that on No. 2 foundry iron. The furnaces in the south as a general rule are holding fairly firm, but there are a few exceptions here also, and $13.25, Birmingham, for No. 2 foundry iron is being offered by one Tennessee furnace, while two Alabama furnaces are reported willing to accept orders at $13.50, Birmingham. Other southern furnaces in both states are asking $14, Birmingham basis, and will not make concessions even on attractive orders. Practically all of the above furnace prices will hold true for both first and second half shipment.

The situation in southern Ohio is a little stronger than that in the south, principally because of the fact that there is only a small amount of re-sale iron to be had in the former district. Furnace iron in this territory is generally being held at $16.50, Ironton, for first and second half delivery, and re-sale iron at $16.25, Ironton, for near-by shipment. There are also a few sales reported made by the furnaces at $16.25, Ironton, but they are not general, and there is almost always some unusual inducement attached to such transactions.

There is an inquiry in the market for 3,000 tons of malleable iron from an Indiana melter for the last half, and another from an Illinois user for 1,000 tons of malleable for the third quarter. The inquiry for 2,000 tons of assorted grades from central Indiana for the second half is still pending. With freight rates $3.25 from Birmingham, and $1.20 from Ironton, we quote Cincinnati prices for the first and second quarters as follows:

Southern foundry No. 1	$17.00 to 17.50
Southern foundry No. 2	16.25 to 17.25
Southern foundry No. 3	16.00 to 16.50
Southern foundry No. 4	15.75 to 16.25
Southern gray forge	15.50 to 16.00
Mottled	15.50 to 15.75
Southern No. 1 soft	17.00 to 17.50
Southern No. 2 soft	16.25 to 17.25
Standard southern car wheel	27.25 to 27.75
Northern No. 2	17.45 to 17.95
Northern No. 3	16.95 to 17.45
Northern No. 4	16.70 to 17.20
Silveries 8 per cent silicon	20.70 to 21.20

Coke.—The downward trend of the coke market, which has been its chief characteristic for the past few weeks, has been checked somewhat, principally because the production and the consumption have become more nearly equalized recently. In some cases, the ovens are asking slightly higher prices than they were at this time last week, but they have not changed much from the general level at which they have held during the past few days. One large producer in the Wise county fields has no spot foundry coke to offer and very little contract furnace coke, and consequently is quoting rather high on both grades. There is an extremely wide range in prices between foundry and furnace coke in several instances, which is caused by the fact that the 48-hour grades have receded much faster than the 72-hour brands during the past few weeks. In the Pocahontas fields, the spot and contract prices are the same, and very little coke can be obtained from that region at the present time. New River coke also is stationary, and the same condition prevails there as in the Pocahontas fields. We quote below from the leading coke producing districts as follows:

Connellsville district:	Prompt shipment.	Contract.
Foundry coke	$3.25 to 4.00	$3.50 to 4.00
Furnace coke	2.60 to 3.00	2.50 to 3.00
Wise county district:		
Foundry coke	$3.25 to 4.00	$3.25 to 3.75
Furnace coke	2.75 to 3.00	2.50 to 3.00
Pocahontas district:		
Foundry coke	$3.25 to 3.75	$3.25 to 3.75
Furnace coke	2.90 to 3.10	2.90 to 3.10
New River:		
Foundry coke	$3.25 to 4.00	$3.25 to 4.00
Furnace coke	2.90 to 3.10	2.90 to 3.10

Finished Material.—The inquiry for sheets continues good, the local mill being offered premiums for delivery six weeks ahead, but it is already 10 weeks behind on deliveries. It is also receiving specifications in a satisfactory manner. We quote warehouse prices, f. o. b. Cincinnati, as follows:

Steel bars, 2.05c to 2.15c, base; iron bars, 2.00c to 2.10c, base; structurals, 2.10c to 2.25c, base; plates, ¼ inch and over, 2.10c to 2.25c, base; sheets, blue annealed No. 10, 2.25c to 2.90c, base; rivets, cone head 2.60c to 2.70c, base; cold rolled shafting, 58 to 55 per cent off on round, and 55 to 50 per cent discount on flat, square and hexagon; steel hoops, 2.10c to 2.20c, base; full extras; boiler tubes as follows: 1½ inch, 46 per cent discount; 1¾ to 2¼ inch, 57 per cent discount; 2½ inch, 60 per cent discount; 2¾ to 3¼ inch, 65 per cent discount; 3½ to 4½ inch, 68 per cent discount; 5 to 6 inch, 60 per cent discount; soft steel cold twisted concrete bars, cut to length as follows: ¾ inch square and larger, 2.15c to 2.25c; ⅝ inch square and larger, 2.25c to 2.35c; ½ inch square and larger, 2.35c to 2.45c; 5-16 inch to ⅛ inch square and larger, 2.25c to 2.65c; and ¼ inch square and larger, 2.65c to 2.75c.

Old Material.—Another week of inactivity has caused scrap iron prices to weaken to a considerable extent, but they have not declined. Fluctuations are very great, as dealers are sometimes offering good inducements in order to bring about more sales. There is very little buying and selling being done and this accounts more than anything else for the fact that prices have held since the latter part of last week. A lack of confidence is generally being shown and concessions for future deliveries are frequent. No. 1 busheling and No. 1 machine cast are the best in demand, the former being quoted at from $9 to $9.50, and the latter at from $10.75 to $11.25, both per net ton. Several lots of bundled sheet scrap have also been sold recently, the average price being $9.25 f. o. b. dealers' yards. The general tendency of all prices is toward a lower level and unless a better buying movement develops within a short time, a decline of 50 cents a ton in most cases will undoubtedly result. We quote below prices dealers will pay and also dealers' selling prices in Cincinnati and vicinity as follows:

Gross Tons

Old iron rails	$13.25 to 13.75
Old steel re-rolling	11.75 to 12.25
Old iron axles	17.75 to 18.25
Heavy melting scrap	11.25 to 11.75
Relaying rails	20.50 to 21.00
Bundled sheet scrap	8.75 to 9.25

Net Tons

Old No. 1 R. R. wrought	$10.50 to 11.00
No. 1 yard wrought	9.00 to 9.50
No. 1 machine cast	10.75 to 11.25
No. 1 busheling	9.00 to 9.50
Stove plate	7.75 to 8.25
Machine shop turnings	6.75 to 7.25
Cast borings	7.00 to 7.50
Heavy turnings	7.25 to 7.75
Mixed cast	9.25 to 9.75
Breakage	7.00 to 7.50
Malleable	8.75 to 9.25

PHILADELPHIA

Deliveries Improve in the East

Office of THE IRON TRADE REVIEW,
Philadelphia, Feb. 18.

Delivery periods in finished products are being slightly cut down among eastern mills, where the new business being taken runs a little below the shipments. In the case of one producer, the Bethlehem Steel Co., this shortening of the schedule of shipments is due to increased steel output, as new open-hearth extensions at South Bethlehem are about to be put in service.

Eastern mills, uniformly, still have a very favorable accumulation of orders which measures up to their full capacity for from one to three months, and there is a very fair volume of new business moving. Prices without exception are still maintained at from $2 to $3 a ton above the schedules of the large Pittsburgh makers. The lifeless pig iron market shows no signs of change. Shipments are heavy. Some producers express the belief that consumers having accumulated considerable iron from last fall's heavy buying movement, as an insurance against possible shortages in a rising market, are now even better fortified against their heavy consumption than their present contracts indicate. Old material prices are still declining as a heavy supply continues to appear. New buying is light.

Pig Iron.—A state of utter indifference on the part of buyers and of independence on the part of the furnaces, leaves the eastern Pennsylvania iron market extremely dull and colorless. The question of the moment appears to be which of the two parties will be forced first to make a decisive lead and the way this present doubt is settled will pronounce the market weak or strong. At this time it is impossible to measure which side of the market predominates, though in a meager way price conditions are soft. Consumption by all signs is continuing very heavy and most of the furnaces have well filled order books for several months ahead. There is a belief among careful market judges on the selling side that buyers have been accumulating some iron in their yards, as a result of the heavy purchases and the advancing market before Jan. 1. If this proves a fact, the amount of this stacked iron will undoubtedly have much influence in determining the date of resumption of buying. Standard eastern Pennsylvania No. 2X stands around $17.50, furnace, or $18.25, Philadelphia, but no sales of size are being made. On other brands, quotations down to $17, furnace, continue. Low grade iron is easy. Some eastern Pennsylvania buyers of mill forge who have been in the market for March-April delivery report being able to buy much below $17, delivered, but at last reports had not closed on this business, aggregating 1,500 to 2,000 tons. Some misfit lots were purchased by a cast iron pipe maker this week at $16.50, delivered. This level is about all the pipe foundries will offer for high sulphur forge at present.

Basic still shows no demand and is nominally about $18, delivered. One consumer is figuring upon 200 tons of low phosphorus basic in addition to 500 to 1,000 tons of malleable for prompt delivery. This buyer has been quoted around $19.25, delivered, on regular malleable, but has not closed, as he desires somewhat special analysis. Small sales of standard low phosphorus were closed this week at the full price of $24.50, Philadelphia. Some quotations on Lebanon low phosphorus as low as $18.50, furnace, are reported though makers in that district usually ask considerably more.

We quote for prompt and first quarter shipment delivered to consumers' plants, in Philadelphia and vicinity, as follows:

Eastern Pa. No. 1X foundry	$18.50 to 18.75
Eastern Pa. No. 2X foundry	18.25 to 18.50
Eastern Pa. No. 2 plain	18.00 to 18.25
Standard forge (Eastern Pa.)	17.00 to 17.25
Basic (Eastern and Central Pa.)	18.00
Virginia No. 2X	18.30 to 18.55
Southern No. 2	17.50 to 18.00
Malleable	19.25 to 19.50
Standard low phos. Phila.	24.50

Iron and Steel Bars.—There is a sharp demand for small angles in the market, a number of buyers having been disappointed in obtaining prompt deliveries on such portions of their regular bar contracts. The smaller mills now able to furnish such angles are asking large premiums. Buyers also continue to pay generous premiums for prompt steel bars. One sale outside this district but in tidewater territory at 2c, delivered, is noted. Deliveries on steel bar contracts are not catching up very fast though in some cases the volume of specifications has shown some slowing up. Premiums for early shipments are not so freely obtainable by the iron bar mills, but the market for contracts and for comparatively nearby delivery remains firm at 1.60c, eastern mill.

We quote for delivery to consumers' plants in Philadelphia and vicinity: Steel bars at 1.55c to 1.60c on contract and common bar iron at 1.65c to 1.75c. Prompt steel bars on mill shipments are quoted at 1.85c to 1.95c, delivered, and from store are quoted at 2c to 2.15c, delivered. Cut nails are quoted from 1.90c to 1.95c, Philadelphia. Shafting is quoted at 58 and 53 off in base territory.

Plates. — Deliveries with eastern plate mills continue to ease up slightly, especially in the lighter gages and in universal plates. The range of shipments from eastern Pennsylvania plants is now from four to six weeks. New business is very fair, though not quite up to the volume maintained before the first of the year and prices are staple at 1.60c, Pittsburgh, for sheared and 1.65c, for universals. The Central Iron & Steel Co. will furnish the 6,000 tons required for a section of the Queens elevated railroad extensions, New York City, for which the Pennsylvania Steel Co. has the contract for erection and fabrication. Eastern shipyards now have bids outstanding for four vessels which will require a round tonnage of steel material.

We quote delivered to consumers' plants in Philadelphia and vicinity: Sheared steel plates on contract, 1.60c to 1.75c; universal plates on contract, 1.60c to 1.80c; sheared plates for early delivery, 1.75c to 1.85c; universal plates for early delivery, 1.80c to 1.85c. Plates from store are quoted at 2.15c to 2.25c, delivered.

Structural Shapes.—Eastern structural mills now generally are making deliveries on standard sections in from six to eight weeks, which represents some improvement. On larger tonnages, some of these makers will accept 1.50c, Pittsburgh, or 1.65c, Philadelphia, but the usual price asked on contracts is 1.60c, Pittsburgh, and for especially early shipment 1.75c, eastern mill, or higher is still the going market. One or two of the mills will not offer the 1.60c, Pittsburgh, price on contracts beyond the first quarter, having not yet open-

ed their books for second quarter. Considerable tonnage from western buyers is still coming to eastern Pennsylvania shape mills at their full schedules, indicating the continued pressure for deliveries in those sections. The Norfolk & Western railroad has somewhat increased its recent bridge inquiry and now has taken bids on about 7,500 tons, which includes one viaduct of 3,250 tons and miscellaneous work. The taking of bids for the office building on South Penn Square, this city, 2,200 tons, has been extended. The McClintic-Marshall Construction Co. has taken through its Pittsburgh office, a warehouse for Larkin & Co., for this city, 1,400 tons.

We quote for delivery to consumers' plants in Philadelphia and vicinity: Structural shapes on contract, 1.60c to 1.75c; for early delivery, 1.80c to 2.00c; from warehouse stocks, 2.15c to 2.25c.

Semi-Finished Steel.—Buyers of slabs, blooms and billets who have been in the market for third and fourth quarters still find many sellers reluctant to obligate themselves so far ahead. There continues a scattered demand for semi-finished steel of all forms, and prices are very strong. Sales of forging billets at the quoted level are noted:

We quote delivered to consumers' plants in Philadelphia and vicinity: 4 x 4-inch open-hearth and Bessemer rolling billets at $29 to $31, and forging billets at from $36 to $40.

Sheets.—An active demand for sheets is maintained and eastern makers have no trouble in obtaining their full prices of 1.90c, Pittsburgh, or 2.05c, Philadelphia, for No. 10 gage. Specifications are liberal.

We quote for delivery to consumers' plants in Philadelphia and vicinity: No. 10 gage annealed sheets at from 1.95c to 2.05c.

Coke.—Marked softness in the prices of prompt furnace coke continues to be shown by eastern transactions. A broker took 25 cars of first grade Connellsville furnace coke at $2.35, ovens, and resold the material at a higher price. A furnace company took 1,500 to 2,000 tons of Latrobe 48-hour coke at $2.20, ovens. Inferior grade Connellsville furnace coke was offered in the east the past week as low as $2, ovens, and first grade material at $2.50, ovens, but the buyer declined to accept in either case.

Boiler Tubes.—An eastern shipyard is inquiring for 23,000 iron or steel boiler tubes to cover the requirements of several vessel contracts recently booked.

Old Material.—General weakness in the old material market has not been modified and the trend of all grades is still downward. Some grades, including car wheels, heavy cast turnings and borings, which have been showing more resistance to decline, have now weakened decidedly. Heavy steel lacks firmness even at $13.50, delivered, and it is quite probable that $13.25, delivered, could be obtained by consumers on some tonnage. Some dealers will still offer $14 to $14.25, delivered, at one mill point to fill higher-priced orders. Offerings of scrap are still heavy and consumers apparently feel no incentive to further increase their stock. That some buyers, however, have accumulated large quantities is shown in the case of one eastern Pennsylvania steel works which now has 40,000 to 45,000 tons on its yards, mostly heavy steel.

We quote gross tons, delivered to consumers' plants in eastern Pennsylvania and western New Jersey, as follows:

Old iron rails	$18.00 to 18.50
Old steel rails (rerolling)	15.75 to 16.25
No. 1 heavy melting steel	13.25 to 13.75
Old car wheels	15.00 to 15.50
Old iron axles	26.00 to 27.00
Old steel axles	20.50 to 21.50
No. 1 railroad wrought	15.50 to 16.00
Wrought pipe	12.50 to 13.00
Cast borings	10.00 to 10.50
Machine shop turnings	10.25 to 10.75
Heavy cast (broken)	14.00 to 14.50
Malleable	13.50 to 14.00
Stove plate	10.75 to 11.25
No. 1 forge	12.50 to 13.00
Low phosphorus	17.50 to 18.00

Freight rates per ton on scrap from Philadelphia to principal eastern consuming points are: $0.60 to Ivy Rock, Pa.; $0.65 to Phoenixville, Pa.; $0.80 to Coatesville, Pa.; $0.85 to Bethlehem, Pa., Reading, Pa., and Roebling, N. J.; $1.10 to Pottsville, Pa., Lebanon, Pa., and Columbia, Pa.; $1.20 to Harrisburg and Steelton, Pa.; $1.40 to Milton, Pa.

BIRMINGHAM

Better Inquiry for Prompt Iron

Office of THE IRON TRADE REVIEW, Birmingham, Ala., Feb. 18.

Pig Iron.—With a perceptible increase in the volume of inquiry for prompt deliveries, and with heavier specifications against old contracts, the condition of the market at this time is decidedly more satisfactory than at the time of last report. The sales made in the past week involve an aggregate of some 2,000 to 2,500 tons, the bulk of which is for delivery in the next 90 days. Prices received within the week range from a basis of $13.25 to $13.75 per ton at Birmingham for No. 2 foundry, depending largely upon the requirement, and the territory into which shipment was to be made. The location of re-sale iron was also effective in the recent price considerations, as considerable of such tonnage was sold and is not included in the aggregate mentioned above. From the most reliable information obtainable, quotations to cover advanced deliveries have not been changed. In the absence of a demand, all advanced quotations are, of course, considered nominal, but in all directions, the indications are considered more favorable for the maintenance of prices very close to those now in effect, when the market is again active. Just when the buying will commence on a broader scale is a matter of speculation. A number of inquiries were submitted in the week, and in certain parts of the foundry trade, actual requirements have recently increased materially; but apparently, all of the larger buyers are well covered, and are quite disposed to withhold from the market until contracts are more nearly completed. At the same time, the smaller buyers, as a rule, did not buy heavily on the last advance, and with the continued strong demand for foundry products, a fair tonnage can reasonably be expected for early delivery. The extent to which this demand, however, will be met with re-sale iron, and off grades that are being offered at concessions, is not known; but without a revision of the furnace prices, it is quite likely that a good portion of such tonnage as just referred to will be withdrawn from the market. The market is quoted as quiet, but with prices as below being adhered to for the remainder of the first half:

No. 1 foundry	$14.00 to 14.50
No. 2 foundry	13.50 to 14.00
No. 3 foundry	13.00 to 13.50
No. 4 foundry	12.50 to 13.00
Gray forge	12.00 to 12.50
Mottled	11.50 to 12.00
Standard basic	14.00 to 14.50
Off basic	11.00 to 11.50
Charcoal	25.00 to 25.60

Old Material.—The present condition of the pig iron market is being reflected decidedly in prices obtainable for all grades of cast scrap, while the recent heavy offerings of the railroads have depressed the market for all wrought grades. Steel scrap is principally in demand, but the tonnage of all grades being forwarded from local yards is small comparatively. Asking prices are being maintained in the majority of cases, and accumulations are still small. We quote as below, prices dealers are asking for their holdings, per gross ton, f. o. b. cars at Birmingham, viz.:

Old iron axles (light)	$15.50 to 16.00
Old steel axles (light)	15.50 to 16.00
Old iron rails	15.50 to 16.00
No. 1 R. R. wrought	13.00 to 13.50
No. 2 R. R. wrought	11.50 to 12.00
No. 1 country wrought	10.00 to 10.50
No. 2 country wrought	9.00 to 9.50
No. 1 machinery cast	11.50 to 12.00
No. 1 steel scrap	11.00 to 11.50
Tram car wheels	11.00 to 11.50
Standard car wheels	13.00 to 13.50
Light cast and stove plate	10.00 to 10.50

NEW YORK

Slight Increase in Interest in Pig Iron

Office of THE IRON TRADE REVIEW,
1115 West Street, Feb. 18.

Iron Ore.—Total sales of Wabana, Newfoundland, ore for delivery to this country during the present year reach about 240,000 tons. If the full tonnage is shipped, it will mean an increase of about 70,000 tons over the past year's movement. The eastern ore market continues inactive, and new buying is scant. Shipments, however, are going forward heavily.

Pig Iron.—In a slight way, there has been a little broader interest displayed by buyers of pig iron in the metropolitan and nearby districts during the past few days, although the tonnage now pending is still almost nominal and aggregates but 3,000 to 4,000 tons of foundry and forge. The largest inquiry now pending is 1,000 tons of several foundry grades for second quarter shipment to a manufacturer of heating apparatus in the Hudson river valley. A Brooklyn buyer is out for 500 tons of foundry iron for forward delivery, one or two other 500-ton lots are out and there is the usual assortment of smaller filling-in needs. One buyer in this district who has been inquiring for 500 tons of No. 2X for first half for a Pennsylvania plant, has decided not to close at present. Under such conditions of scant buying interest, price conditions are more or less uncertain and it is difficult to state how far the prevailing softness would extend on an attractive order. According to present indications, the range of the market for No. 2X foundry is from $18 to $18.25, tidewater, representing $17 to $17.50, eastern Pennsylvania furnace. Virginia No. 2X for prompt or forward shipment is quoted at $15.50, furnace, or $18.30, New York docks. Buffalo irons are around $17, furnace, for No. 2X. One Buffalo maker reports a regular run of sales so far this month, aggregating about 25,000 tons, the largest single lot of which is 5,500 tons. These sales were made at the range of $17, furnace, and upward for No. 2X. Inquiries are pending for 3,000 to 4,000 tons of southern foundry for shipment to Mediterranean ports, but the difficulty of obtaining vessel accommodations is interfering with American furnaces making such sales.

We quote for prompt and first half shipment at tidewater, as follows:

Northern foundry No. 1	$18.25 to 18.50
Northern No. 2X foundry	18.00 to 18.25
Northern No. 2 plain	17.75 to 18.00
No. 2 Virginia	18.30 to 18.55
No. 2 southern foundry	18.50 to 18.75
Malleable	19.00 to 19.50
Gray forge	17.00 to 17.25

Ferro-Alloys.—Carload and small lot sales represent the present interest in ferro-manganese and these usually bring the general price of $55.00, seaboard, though in some cases, shading of 25 cents or more is done on re-sale material. The forward market on ferro-manganese continues firmly established at $65.00, seaboard. There is very little inquiry for any of the alloys at present.

We quote standard English 80 per cent ferro-manganese at $64 to $65, seaboard, for early and for first half shipment and $65 for second half; 50 per cent ferro-silicon on contract at $75, Pittsburgh or Philadelphia, for carloads, $74, for larger lots, and $73, for 600 tons or more.

Plates.—Booth & Flynn, Pittsburgh, were awarded the contract the past week at Newark, N. J., for the construction of the Passaic Valley sewer, which will involve a requirement of about 18,000 tons of plates for riveted pipe construction. Pittsburgh mills are expected to get this tonnage. Car buying is fairly active. The Boston & Maine railroad has revived an old inquiry and is on the point of closing for 3,500 to 4,500 cars, mostly of the box type. The Atlantic Coast Line has placed 1,000 hoppers and 300 flats with the Barney & Smith Car Mfg. Co. The 1,000 box cars for the Rock Island are reported to have gone to the Western Steel Car & Foundry Co. Specifications have been issued by the Seaboard Air Line for 1,500 cars. The Baltimore & Ohio will shortly act on its inquiry for 1,000 hoppers and 500 refrigerators and its purchase may considerably exceed its inquiry. The Carnegie Steel Co. will furnish about 10,000 tons of plates for the Queens elevated railroad extension recently placed with the American Bridge Co. Bids are going in today for the construction of the battleship Pennsylvania, to require about 15,000 tons, exclusive of the armor. Eastern plate mills are now able to furnish both universal and sheared plates at slightly shorter deliveries, which usually range from four to six weeks. There is no improvement in the plate deliveries of middle western mills. Prices among eastern makers continue 1.60c, Pittsburgh, for sheared, and 1.75c, Pittsburgh, for universals, or 1.76c to 1.81c, New York.

We quote, delivered at New York tidewater, for first quarter, 1.76c to 1.81c, New York, on sheared plates. Some makers are asking $1 higher for universal plates. On third quarter and last half contracts, Pittsburgh district, makers are quoting 1.61c to 1.66c, New York. Plates from store 2.15c.

Structural Material.—From all reports, a very heavy tonnage of work is in the development stage in this district, exclusive of the enormous subway and elevated extensions which continue to present a prospective need of 300,000 tons or more. Bids will shortly be asked for the Broadway section to require about 10,000 tons and it is estimated that probably 75,000 tons of elevated and subway work for city-built sections will come out before the pending operating contracts between the city and the rapid transit companies are formally terminated. When this latter action is taken, it will release the great part of the heavy rapid transit steel requirements now in sight. The American Bridge Co. has formally taken the 24,000 tons for the Queens elevated railroad extension which had previously been credited to this fabricator and has also formally closed for 2,700 tons for the Penn Mutual Life Insurance building, Philadelphia, also previously conceded to this interest. The Harris H. Uris Iron Works has 2,000 tons for the Standard Mail Order Co. loft, Fifty-fifth street, this city; Levering & Gerrigues, 1,600 tons for the lithographing building, this city, of Heyward, Strasser & Voight; the Fabian Iron Works, 700 tons for the Elizabeth high school, Elizabeth, N. J.; the Boston Bridge Works, 400 tons, for four bridges for the Boston & Maine railroad and the McClintic-Marshall Construction Co., 220 tons for coal trestles for the Philadelphia & Reading railroad, at Philadelphia. Bids are being taken for a New York Central station, at Utica, N. Y., 1,100 tons, and will go in Feb. 24, for the Lord & Taylor store, this city, 6,000 tons or more. The builders of the latter structure are requiring unusual celerity in the execution of this

contract, calling for the razing of the present structure on the site and the completion of a large 10-story store building by Dec. 1, this year. Heavy bonuses and penalties are provided in this work. The St. Paul railroad is inquiring for 1,200 tons of bridge work. Plain shapes are obtainable more promptly from eastern mills and deliveries now run from six to eight weeks. New business in the east has been falling behind shipments, and the forward tonnage is being somewhat reduced. Makers expect, however, that they will quickly replenish this business with the oncoming spring business. Shape prices in the eastern market range from 1.50c to 1.60c, Pittsburgh, or 1.66c to 1.70c, New York. Especially prompt deliveries still command some premiums.

We quote for New York delivery for first quarter as follows: Structural shapes, 1.66c to 1.76c. On third quarter and last half contracts, Pittsburgh district makers are quoting 1.61c to 1.66c New York.
Structural shapes from store, 2.15c.

Iron and Steel Bars.—Large producers of steel bars continue to accept more slowly contracts for third and fourth quarters at the 1.40c, Pittsburgh price, owing to the heavy tonnage already booked. Buying, as a consequence, is not so active. Consumers continue to file specifications for many months ahead. Bar iron in the east is in good demand, but the mills are not able to obtain so easily advances over the general minimum of 1.60c, mill, where quick deliveries are offered.

We quote for New York delivery, steel bars on contract from 1.56c to 1.61c, and common iron bars, 1.65c to 1.75c. Steel bars from store are quoted at 2.05c.

Cast Iron Pipe. — American manufacturers of cast iron pipe are now devoting more interested attention to large requirements which are coming out from South American countries. The city of Buenos Ayres, Argentine, recently made arrangements to purchase 250,000 tons of pipe for water works construction during the next five years, or 50,000 tons annually. This requirement for the present year has gone to Scotch makers. South American business generally in cast pipe has usually been taken by English and German makers. Brazil will soon present a requirement of from 30,000 to 40,000 tons of pipe. There is a good movement to the domestic pipe market both in private and public lettings. The United States Cast Iron Pipe & Foundry Co. has taken 2,600 tons for Worcester, Mass., at $24.10, delivered, and 750 tons for Beverly, Mass., at prices ranging from $24.50 to $26.50, delivered. New public offerings include 2,200 tons for Atlantic City, 1,500 tons for Hartford, Conn., both to close Feb. 20, and 3,600 tons for Toronto to close March 4.

We quote six-inch pipe at from $24 to $26, f. o. b. New York, in carload lots.

Rails and Track Material. — The Lorain Steel Co. has booked 1,500 tons of girder rails from the Fort Wayne & Northern Indiana railroad. The Pennsylvania Steel Co. has taken 500 tons of rails from the Susquehanna, Bloomsburg & Berwick Railroad and 500 tons of girder rails from the Puget Sound Light Heating Power Co. The Lehigh Valley Coal Co. is inquiring for 1,000 tons of light rails. The Third Avenue Railroad Co. will shortly award its inquiry of 1,500 tons. There is some inquiry for light rails from Cuba.

Semi-Finished Steel. — A Buffalo maker has made additional sales of open-hearth billets aggregating 10,000 to 15,000 tons for delivery to Pittsburgh, Sharon and Cleveland consumers, some of whom are steel producers. Open-hearth billets remain firm in the east at $28, mill minimum.

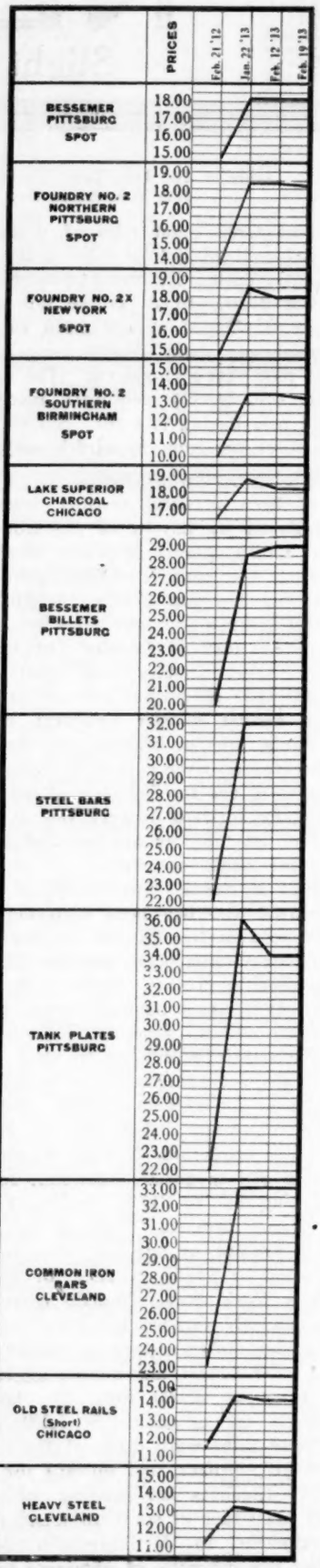
Old Material.—Large producers of scrap show no desire to hold back old material and they are putting it out upon the market at whatever price it will bring. Consumers continue in a receptive mood and the result is a further falling in values. Heavy melting steel has touched a new low level in the eastern market at $13.25, delivered, one lot of 500 tons being reported on this basis. Some buyers are now offering but $12.50 to $12.75, delivered. Wrought scrap is dragging, offers continuing below $15, delivered. Other grades are heavy and are still settling to lower levels.

We quote gross tons prices New York dealers will pay at tidewater for shipment usually to the eastern Pennsylvania consuming market, as follows:

Old car wheels	$13.00 to 13.50
Old iron axles	23.00 to 23.50
Steel axles	15.00 to 15.50
Old steel shafting	14.50 to 15.00
No. 1 heavy melting steel	11.00 to 11.25
No. 1 R. R. wrought	13.00 to 13.50
Wrought pipe (not galvanized)	10.00 to 10.50
Cast borings	7.75 to 8.25
Machine shop turnings	8.25 to 8.75
Heavy cast	11.75 to 12.00
Stove plate	9.00 to 9.25
Grate bars	8.00 to 8.25

Freight rates on scrap per ton to Steelton, Pa., Columbia, Pa., Pottsville, Pa., and Harrisburg, Pa., are $1.50 from Jersey City, and $2.00 from New York; to Coatesville, Pa., Ivy Rock, Pa., Phoenixville, Pa., and Reading, Pa., $1.50 from Jersey City, and $1.80 from New York; to Bethlehem, Pa., $1.10 from Jersey City, and $1.60 from New York; to Roebling, N. J., $1.00 from Jersey City, and $1.50 from New York; to Milton, Pa., $1.60 from Jersey City, and $2.00 from New York; to Jersey City, $1.00 from New York; to Newark, $1.10 from New York.

PRICE CHART



BRITISH MARKET

Decided Dullness Prevails

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Feb. 8.

Pig Iron.—From all parts of the country comes news of dullness in the iron and steel trade. To a large extent, the resumption of the war is responsible, the Cleveland market immediately reflecting political disturbances. In the Cleveland district, there is practically no business passing with makers; but, somewhat curiously, stocks are being drawn upon, so that the amount in store has been brought down about 5,000 tons in three days. The amount now in store is 231,000 tons and the selling price for cash transactions is 64s 9d ($15.84), with 65s 2d ($15.94) one month, and 64s 10d ($15.86) three months. These figures sufficiently show the lack of confidence in the future, yet makers decline to do business at present prices, and, in spite of fluctuations, prices practically stand where they did a fortnight ago. Most of the business done has been by merchants, who have shaded makers' quotations somewhat. The furnaces are giving full deliveries both to home consumers and on shipments. The loadings of pig iron for January were 92,700 tons, or 6,000 tons more than for the same period last year. It is remarkable that the stocks were reduced during the first week in February as much as for the whole of the previous month.

Finished Iron and Steel.—There has been a marked falling off in tone during the last week or two due to various causes. While the mills in all directions are making, practically, full time, specifications have almost collapsed, and several of the works must be held up shortly, if things do not mend. Such buying as is going on is entirely on the hand-to-mouth principle, and it is generally agreed that the present is altogether an unfavorable time for making long contracts. The renewal of the war has inflicted a serious blow on the iron and steel trades, and especially on the sheet and tin plate departments.

The main thoroughfare of eastern trade, namely the Black Sea, is practically closed to business, and this has shut off one of the best markets.

The state of affairs in South Wales has become desperate. A large dealer in Birmingham the other day was informed by a Welsh tin plate maker that he lost 4½d on every box of tin plates produced. Stocks have been accumulating seriously lately, and, at a meeting this week of the South Wales and Monmouthshire Tin Plate Manufacturers' Association, it was decided to curtail the output by 25 per cent. In addition to the Balkan war, the trade has never quite recovered from the effects of the coal strike nearly a year ago. The great prosperity of the American tin plate trade is regarded with some concern here, and it is pointed out that the United States has not only established new records in turning out 900,000 tons in a year, but has made inroads into markets which were formerly exclusively in the hands of the Welsh makers. Welsh mill men, although their trade is 100 years old, have never been able to equal the present American output, which represents an increase of 200,000 tons in two years. The sheet trade is in somewhat the same position, the demand never having quite kept pace with the great increase in supply during the past two years.

Completing New Open Hearths

The first of the new group of six open hearth furnaces which the Bethlehem Steel Co. has been building to its Saucon plant at South Bethlehem, Pa., will be fired sometime in March, according to present indications. The other five furnaces will be put in operation at intervals very quickly thereafter. The new furnaces are of the 75-ton type and will add about 25,000 to 30,000 tons of ingots monthly to the company's steel capacity, which will be utilized largely in the rail and structural departments.

ST. LOUIS

Very Little Buying of Pig Iron

Office of THE IRON TRADE REVIEW,
St. Louis, Feb. 18.

Pig Iron.—Buying in pig iron remains at a very low ebb, with the inquiry for 2,000 tons of car wheel pig iron, that has been on the market for two weeks, about the only business in sight. Although southern No. 2 is quoted at $13.50, f. o. b., Birmingham, it is by no means certain that this price could not be shaded for spot shipment. Northern iron is quoted at $17.50, Chicago furnace, and at $16.50, f. o. b., Ironton.

Prices on southern iron delivered, to which the Birmingham freight of $3.75 has been added, follow:

Southern No. 1	$17.75 to 18.00
Southern No. 2	17.25 to 17.50
Southern No. 3	16.75 to 17.00
Southern No. 4	16.50 to 16.75

Coke.—Nothing but car load shipments is being sold in the coke line, and there seems to be nothing to warrant better conditions in the near future. Connellsville 72-hour foundry grades are quoted at $3.50 to $3.75, ovens.

We quote 72-hour Connellsville foundry grades, $4.50 for immediate shipment or delivery; prompt 48-hour Connellsville furnace, $4.00; contract, $3.25; best 72-hour Virginia foundry, for immediate shipment, $4.25, and for next year, $4.00; 48 hour Virginia furnace, $3.25 to $3.50. The freight to East St. Louis and St. Louis is $2.80, and $2.70 from the Virginia fields when shipment is destined beyond St. Louis.

Old Material. — Considerable improvement is noted in scrap conditions over last week. The mills, especially the rolling mills, are running to full capacity, and one of the large steel plants in the St. Louis territory is reported to have placed an order for 5,000 tons of scrap. Dealers in the St. Louis territory are quite optimistic. No lists are out this week.

Prices which dealers are willing to pay f. o. b. St. Louis, follow:

Gross Tons

Old car wheels	$14.50 to 15.00
Old iron rails	14.00 to 14.50
Rerol'g rails (5 ft. and over)	15.00 to 15.50
Old st'l rails (3 ft. and under)	13.50 to 14.00
Light section relayers (45 lbs. and under) subject to inspec.	23.50 to 24.50
Relay'g rails, subject to inspec.	23.50 to 24.50
Frogs, switches and guards	13.00 to 13.50
Heavy melting steel	13.00 to 13.50
Shoveling steel	11.25 to 11.50

Net Tons

No. 1 railroad wrought	$12.00 to 12.50
No. 2 railroad wrought	11.50 to 12.00
Arch bars and transoms	14.50 to 15.00
Knuckles, couplers, springs	11.00 to 11.50
Shafting	14.50 to 15.00
Iron car axles	21.50 to 22.00
Steel car axles	18.00 to 18.50
Locomotive tires	12.00 to 12.50
Pipe and flues	7.00 to 7.50
Tank iron and cut boilers	7.00 to 7.50
No. 1 cut busheling	10.00 to 10.50
No. 2 cut busheling	8.00 to 8.50
Cast and mixed borings	6.75 to 7.25
Machine shop turnings	8.25 to 8.75
R. R. malleable	11.00 to 11.50
Agricultural, malleable	9.50 to 10.00
Stove plates	8.50 to 8.75
Angle splice bars (iron)	13.00 to 13.50
Angle splice bars (steel)	12.00 to 12.25

METAL MARKETS

New York

Feb. 18.

Copper.—The futility of trying to hold the price of copper above 16c seemed to become apparent to the leading sellers simultaneously last Friday and quotations were reduced precipitately to 15c for both lake and electrolytic, regular terms.

All sellers are offering copper today as follows: Lake 15c cash; electrolytic 14.87½c cash New York, and 15c, delivered, 30 days, and casting 14.75c. The London market closed steady at £64 for spot and £63 17s 6d for three months. Exports of copper since Feb. 1, are 18,779 tons.

Tin.—There is strong pressure being exerted in the local tin market to hold spot and February metal at a premium. The movement to squeeze the local market up became less pronounced today in the face of lower quotations from abroad, and sales were made at a decline of about ½c from yesterday's price. Spot and February closed at 48.60c; March at 47.75c, and April at 47.50c. July tin sold at 46.50c on the New York metal exchange. Arrivals of tin since Feb. 1, aggregate 2,090 tons and there are 3,720 tons afloat.

Lead.—The demand for and offerings of lead appear to be well balanced and the price remains firm at 4.30c in New York.

Chicago

Feb. 18.

New Metals.—The market for new metals appears to be very quiet in this territory and prices are very much lower than those quoted for the previous week. Copper has declined 1⅛ cents and spelter and lead are much weaker. Further reductions in the price of zinc have been made, the market now being quoted at $8.50 f. o. b. La Salle, as compared with $8.75 previously quoted.

We quote dealers' selling prices f. o. b. Chicago, as follows:

Lake copper, carload lots, 14¼c, casting, 15⅛c; smaller lots, ¼c to ¾c higher. Spelter, car lots, 6.35c; lead, desilverized, 4.25c; sheet zinc, 8.50c, f. o. b. La Salle, in car lots of 600-pound casks; pig tin, 48.77c. Cookson's antimony, 9½c; other grades, 8⅜c.

The directors of La Belle Iron Works, Steubenville, O., at a special meeting this week, voted to refer to the company stockholders the proposition of giving an option on the plant to New York financiers. Stockholders will meet March 11 and their action will determine whether the La Belle company will enter into the proposed merger of independent tin plate companies in western Pennsylvania, West Virginia and Ohio.

HOPEFUL VIEW

Taken by President Hoffstott of the Pressed Steel Car Co.

New York, Feb. 19. (By wire.)—President Hoffstott, of the Pressed Steel Car Co., in his annual report issued today, speaks encouragingly of prospects for a continuation of heavy equipment buying by railroads. He says: "The increased activity in car buying during the last three months of 1912 exceeded largely any similar period in several years. This presents a more favorable situation for the new year and encourages us to believe that during the present year we will enjoy a greatly increased volume of business." Mr. Hoffstott says the operation of plants was restricted during the last quarter by delays in securing materials. The margin of profits is small. Gross sales of the year were $19,019,402; net earnings, $970,343. The surplus after dividends, $95,343.

Sale of Forge

Philadelphia, Feb. 19. (By wire.)—Schuylkill Valley Rolling Mill has closed with an eastern furnace for 1,500 to 2,000 tons of forge iron, shading $17, delivered. The iron is reported to have been slightly off in quality.

Tonnage Tax Bill Killed

Chicago, Feb. 19. (By wire.)—The Minnesota legislature yesterday defeated the tonnage tax bill. It will not come up again this year.

Blast Furnace Improvements

Arthur G. McKee, consulting and contracting engineer, Cleveland, has taken the contract for the reconstruction of the blast furnace of the Standard Iron Co., at Deseronto, Ont., Can. The work will include a new hearth jacket, bosh jacket, columns and complete new steel construction throughout below the mantle. A new top structure and furnace lining will also be provided. The contract also includes the construction of two cast iron pipe stoves with blast and gas mains, and other auxiliary equipment.

Mr. McKee has also taken the contract from the Detroit Iron & Steel Co. for the construction of new stock bins and storage trestle in connection with its No. 1 furnace. The ore and limestone bins will be of the recently patented, Baker suspension type. The steel construction, amounting to approximately 400 tons, has been sublet to the Lackawanna Bridge Co.

Car Buying

Car orders for the week ending Feb. 15 were as follows:

Pennsylvania Railroad system, 3,000 hopper coke cars for lines east and 1,500 hopper coke cars for lines west to the Cambria Steel Co., 2,000 hopper coke cars for lines east and 500 box cars for lines west to the Pressed Steel Car Co.; 500 gondolas and 1,500 refrigerator cars for lines west to the American Car & Foundry Co.; 1,500 coke hopper cars and 805 gondolas for lines west to the Standard Steel Car Co.; 500 gondolas for lines west to the Ralston Steel Car Co.; and 500 gondolas for lines west to the Western Car & Foundry Co.

The Harriman Lines, 5,000 box and stock cars to the Pullman Co.; 2,700 gondola, hopper and tank cars to the Pressed Steel Car Co.; 2,300 box cars to the American Car & Foundry Co.; 2,000 box and automobile cars and cabooses to the Standard Steel Car Co., and 1,300 work and flat cars to the Bettendorf Axle Co.

The Berwind White Coal Mine Co., 100 hoppers to the Cambria Steel Co.

The Atlantic Coast Line, 1,000 hoppers and 300 flat cars to the Barney & Smith Car Co.

Inquiries as follows were pending Feb. 15:

B. & O., 1,000 hoppers and 500 refrigerator cars.
The Seaboard Air Line, 1,500 cars.
The Norfolk & Southern, 500 cars.
The C. & O., 3 000 cars.
The Havana Central, 740 freight cars.
The Mineral Range, 100 all-steel rock cars.
The Missouri, Kansas & Texas, 1,000 drop-bottom stock cars.

Structural Contracts

Structural contracts and contracts for shapes and plates for vessels for the week ending Feb. 15, were as follows:

Newport News Ship Building & Dry Dock Co., 15,000 tons of shapes and plates, to the Cambria Steel Co.

Municipal lighting plant, Cleveland, 935 tons, to the McClintic-Marshall Construction Co.

Reibold 11-story office building, Dayton, O., 1,600 tons to the Noelke-Richards Iron Wks.

Extension to the National Lead Co.'s Jewett Works, New York City, 800 tons to the Jones & Laughlin Co.

Up-town building for the Sheffield Farms-Slawson-Decker Co., 1,400 tons to the Radley Construction Co.

Bradstreets printing building, New York City, 1,800 tons, Bethlehem steel, to Eidlitz & Ross.

Boston & Maine Bridge at Hoosick, N. Y., 500 tons, to the Boston Bridge Co.

Barge canal bridge at Oswego, N. Y., 600 tons, to the Phoenix Bridge Co.

Queens elevated railroad extension, New York City, 12,000 tons, to the Pennsylvania Steel Co.

Two large freight and passenger steamships for new line, not named, to be operated through Panama canal, about 15,000 tons of shapes and plates, to the William Cramp & Sons Ship & Engine Building Co.

Three steel car ferries for Grand Rapids & Northwestern Railway Co., about 9,000 tons, to the Great Lakes Engineering Works.

Heywood, Strasser & Voight Co.'s building, New York City, 1,500 tons, to Levering & Gerrigues.

The Extent of the Chilian Iron Ore Deposits

The Recent Purchase by the Bethlehem Steel Co. Involves a Larger Tonnage Than First Reported—Analyses of Chilian Ores

Chilean iron ores have acquired a new significance since the Bethlehem Steel Co., South Bethlehem, Pa., purchased the Tofo mines, formerly owned by the Societe Francaise des Hauts-Fourneaux du Chili. Charles M. Schwab, president of the Bethlehem company, estimates that these mines embrace fully 100,000,000 tons of high grade iron ore and it would seem that this appraisement is conservative, as a French investigator estimated the extent of these deposits at not less than 145,000,000 tons. Moreover, in other parts of Chili, there are many iron ore deposits which are promising though not developed quite as well as the Tofo property.

The only other iron mine which has been operated in Chili is the Aguas Buenas, which for some years has been worked on a small scale, the ore having been shipped to Antofagasta for use as a flux for siliceous silver ores. Another mine, located near Taltal, while being worked for other metals, has produced a similar ore in limited quantities. The iron ore deposits of Chili occur principally in the center of the country and no other district, it is believed, has greater iron resources, either as to quality or quantity. The Chilean ores frequently are mingled with copper, to such an extent, in fact, as to have led to the working of many of the deposits for copper instead of iron. The sulphur content is low and the gangue is generally siliceous and only occasionally calcareous. Some of the ores, particularly the magnetites, are hard and compact and contain a high percentage of iron, but require preliminary roasting before they can be used successfully in blast furnaces. The highest grade ores are similar to those found in Russia and Brazil, both in grade and freedom from phosphorus.

Antofagasta Province

About 12½ miles from the port of Mejillones, in the department of Antofagasta, are several thick veins and seams of iron oxide, which often appear mixed with copper and manganese ores. For about 15 years, Cerro Cordo and other regions on the Atlantic coast, in the vicinity of the port of Antofagasta, have been worked for iron ore for the plant at Bella Vista and at Playa Blanco, where they have been used as fluxes for the melting of silver ores.

Toward the south, near the port of Taltal, in the department of the same name, are the more important iron ore deposits of the province of Antofagasta. North of Taltal is a small bay or cove called Hueso Parado, where it would be easy to construct a harbor for loading. Either by means of an inclined plane, or by an aerial ropeway, about 550 yards in length, the iron ores of one of the principal deposits could be lowered to a loading stage in Hueso Parado bay. These ores are found in the form of fairly thick veins, and cuts made in the ferruginous mass have laid bare depths of 30 to 50 feet.

MAP OF CHILI, SHOWING PRINCIPAL IRON ORE DEPOSITS

Further north, and at a still higher level, in the direction of the concession known as Norte Magnetico, the ores appear to be of great pureness and abundance. No systematic prospecting has so far been carried on in this region, and although large quantities of excellent ores are known to exist, it is impossible to even approximate their amount. Those which predominate are magnetites and hematites. Samples from these deposits analyzed in Holland gave the results shown in Table I.

The location of these deposits on the sea coast and the facilities that exist for carriage and loading render them of great interest, particularly from the point of view of their exportation to the United States, when the Panama canal shall have been opened. Two samples of iron ore, taken close to the coast in the Antofagasta region, analyzed as follows:

	Per cent.	
Iron	61.75	59.81
Manganese	traces	traces
Sulphur	0.29	0.68
Phosphorus	0.037	0.033
Copper	0.038	0.045
Arsenic	traces	traces

About 4 miles east of Taltal, in a mountain region known as Cachina, it is possible to follow the outcrops of red hematite, forming veins of varying thickness. The bulk of the deposits are covered by alluvial earths. These deposits show outcrops 65 feet in thickness over a distance of 2,200 yards and analyses of three samples are contained in Table II.

Seven and one-half miles southeast of the bay of Cifunchos, or Lavala bay, is the Victoria concession in the mining centers of Argolla and Velado, with deposits of iron ores with calcareous gangue and traces of galena, chlorides and bromides.

Atacama Province

The provinces of Atacama and Coquimbo possess the most abundant and best-known deposits of iron, and contain the purest iron ores. In the department of Chanaral, the port of which, with the developments now in

progress, would admit of the economical loading of cargoes, are found, in addition to deposits of cupriferous iron ore, important deposits of ores containing high percentages of iron oxide, which at the surface are pure

Table I.

Sample.	Iron. per cent.	Silica. per cent.	Phosphorus. per cent.
1.....	63.91	3.10	0.054
2.....	51.00	16.096	traces
3.....	64.35	8.736	0.025
4.....	.....	.....	0.351
5.....	62.89	7.384	0.007
6.....	63.36	4.136	0.003
7.....	62.84	5.872	0.013

Sulphur is only present in traces.

and free from copper, but which would probably at greater depths become cupriferous.

In the neighborhood of the ferruginous copper mines of Tres Gracias, and of Carmen, 40 miles from the harbor, there are found, at distances varying from 1 to 3 miles north of the line of railway and 35 to 36 miles from the coast, numerous hummocks, the sides of which show pure oxide of iron stratified with veins and seams of iron ore containing from 65 to 68 per cent iron.

Table II.

	Per cent.		
Silica	9.37	11.2	9.60
Iron oxide	83.73	78.67	87.39
Manganese oxide.	.....	.....	.....
Lime	0.60	0.30	0.20
Magnesia	0.216	0.18	0.10
Alumina	0.38	2.70	2.80
Sulphur	0.65	1.76	0.137
Phosphoric acid..	0.098	0.073	0.057
Iron	58.70	55.10	59.10

In the department of Copiapo, near Tierra Amarilla, about 70 miles from the coast, thick seams of excellent iron oxide have been found. These deposits could be advantageously worked and transported by the existing railway to the port of Caldera, one of the best harbors on the Pacific, from which, with transport appliances, it will be possible to load the steamers direct. Two analyses of samples of this iron ore made at the laboratory of the Paris School of

Table III.

	Per cent.	Per cent.
Iron	64.41	63.40
Manganese	0.18	0.14
Sulphur	0.032	0.048
Phosphorus	0.034	0.06
Copper	0.08	0.028
Arsenic	traces	traces

Mines, gave the results show in Table III.

In the Carrizal region and near Canto de Agua, important deposits of iron ore exist, which would be easy to transport by rail from Canto de Agua to the coast, 17 miles distant. Loading could be effected at the harbor at Carrizal, which is, however, poorly sheltered.

The most important iron ore deposits in the province of Atacama are found a few miles from the town of Vallenar, where on the plateau overhanging the town, numerous outcrops appear. These outcrops have been worked for use as fluxes at the blast furnaces of Antofagasta for smelting siliceous copper and silver ores. A few miles from Vallenar are the immense iron oxide deposits of Ojos de Agua, forming the bulk of a huge mountain, the two black sides of which are composed of pure iron oxide. This mountain displays iron oxide in the form of thick seams intersected by sterile dykes, and, in the lower portion, by some cupriferous veins. Huge blocks of the ore, of several hundred cubic meters in volume, are found on the slopes of the mountain and on the surrounding uplands.

Table IV.

	Per cent		
Combined water	2.000	1.610	1.000
Carbonic acid	traces	traces	traces
Silica	1.800	3.500	0.100
Alumina	0.400	0.600	1.000
Lime	traces	traces	traces
Manganese	traces	traces	traces
Protoxide of iron	10.280	21.210	.....
Peroxide of iron.....	85.712	73.710	98.570
Manganese oxide	traces	traces	traces
Sulphuric acid	0.105	0.045	0.067
Phosphoric acid	0.110	0.037	0.023
Totals	100.407	100.712	100.760
Iron	68.000	68.100	69.000
Manganese	traces	traces	traces
Sulphur	0.042	0.015	0.027
Phosphorus	0.048	0.016	0.010

An analysis of samples of these minerals gave the following result: Iron, 63.30 per cent; manganese, traces; sulphur, 0.069 per cent; phosphorus, 0.137 per cent; copper, 0.088 per cent, and arsenic, traces.

About 40 miles from the port of Huasco are found the remarkable deposits of Algarrobo and Algarobillo, which, like those of Ojos de Agua, have been conceded to a French syndicate which is planning a special line of railway 35 miles in length and extending as far as Huasco Viejo bay. Connected with the little island of Bacheylor, this bay would afford an easy and cheap port for the shipment of ore. These immense deposits at Algarrobo have not been verified, except by a few survey shafts which have been made, but it may be regarded as certain that their cubical contents are exceptionally large. According to data furnished by the proprietors, analyses made on 158 samples have given, for the three groups of which the mines consist, the results shown in Table IV.

Further south in the desert, near the boundaries between the province of Atacama and that of Coquimbo, there are numerous outcrops of iron ore as well as many boulders and lumps disseminated over the surface of the soil. These concessions belong to mining companies at Antofagasta, Serena and Santiago, and are known as the Cristales, Ratones and Pleito. It is not known that these deposits are either considerable or continuous, and difficulties may be encountered in their shipment.

The principal port of embarkation of the province of Coquimbo is the town of Coquimbo, which is 190 miles north of Valparaiso. From this province there has been obtained on a large scale some of the best manganese ore sent to Europe. It is in the departments of Serena, Ovalle and Coquimbo that the chief deposits have been found.

Table V.

No.	Iron, per cent.	Silica, per cent.	Phosphorus, per cent.	Sulphur, per cent.
1.....	67.92	1.42	0.013	traces
2.....	70.42	0.536	nil	traces
3.....	70.42	0.536	0.019	traces

In the department of Serena in the province of Coquimbo are the Tofo mines, formerly owned by the Societe des Hauts-Fourneaux, Forges, et Cicieries due Chili, and recently purchased for the Bethlehem Steel Co. by Charles M. Schwab. A somewhat detailed description of these mines

and of the methods which have been employed in working them will be found in the latter part of this article.

About 15 miles north of Serena is another district known as Romeral, from which several samples were analyzed with the results given in Table V.

Several miles from the port of Coquimbo, and near Pan de Azucar mountain, in the Santa Elena estate, there appear on the summits and western slopes of small mountains important outcrops of iron ore. These deposits could be worked by a large crosscut, and quarried in the open at the foot of the mountain, while the ores could easily and cheaply be transported as far as the port of Coquimbo, either directly or by a narrow-gage railway of low gradient along the plain as far as the port, or by a branch line from the Serena to Coquimbo railway. Samples recently analyzed showed the results given in Table VI.

Table VI.

No.	Iron, per cent.	Silica, per cent.	Phosphorus, per cent.	Sulphur, per cent.
1	70.43	0.93	0.015	traces
2	68.47	1.32	0.013	traces
3	68.33	0.968	0.036	traces
4	68.33	0.968	0.386	traces

On the line of the railway connecting Coquimbo with Ovalle, close to the station at Penon, appear thick veins of cupriferous iron oxide, over 32 feet in thickness. They are worked as fluxes with the silver ores at Bella Vista and Antofagasta. They average: Iron, 57.46 per cent; manganese, 0.77 per cent; sulphur, 0.009 per cent; phosphorus, 0.02 per cent, and copper, 1.34 per cent. However, before arriving at the station at Pejerreys, which is 42 miles from Coquimbo, iron ore mines, properly so called, are found, such as those of Aguas Buenas, which have been worked for about 15 years in order to furnish fluxes for the silver ores for the Playa Blanca works of the Huanchaca Co. Samples analyzed show the results given in Table VII.

Table VII.

No.	Iron, per cent.	Manganese, per cent.	Sulphur, per cent.	Phosphorus, per cent.	Copper, per cent.
1	56.64	traces	0.007	0.039	0.070
2	63.39	0.08	0.013	0.21	0.14
3	55.56	0.12	0.005	0.029	0.075

Several miles from the town of Ovalle and nearly opposite the celebrated copper mines of Tamaya, appear numerous boulders and lumps of iron oxides, which would yield millions of tons of good ore merely by loading the debris strewn over the surface, and by working by open-cast methods. A gallery, about 70 yards in length, driven in the lower portion of these deposits in a vain attempt to discover copper ore, reveals that the quantity and quality of the ore continues to improve the further down operations are extended.

Transportation to the coast could be effected either to the port of Tongoy or even to Coquimbo itself. To use the port of Tongoy it would be necessary to transport the ore either by small narrow-gage railways or by aerial cables as far as Trapiche and thence by the recently completed railway the remaining distance of about 40 miles. This port, although badly sheltered from the south wind, is easily capable of improvement by dredging and even in its present condition a good deal of bar copper and copper ores and coal are cargoed. It also would be possible to ship these ores to Coquimbo by building a short line of railway from the mines to Ovalle or Puntillas, and there connecting with the line of railway which is operating to the town of Coquimbo.

Table VIII.

No.	Iron, per cent.	Silica, per cent.	Phosphorus, per cent.	Sulphur, per cent.
1	67.52	1.38	0.323	traces
2	68.47	0.824	0.037	traces
3	67.42	2.71	0.015	traces
4	68.62	0.632	0.028	traces
5	68.62	0.632	0.217	traces
6	67.66	0.632	0.344	traces
7	61.06	4.272	nil	traces
8	60.81	3.616	nil	traces

These Dorado deposits are, from every point of view, of real importance. Analyses of various samples gave the results shown in Table VIII.

About 3 miles south of Illapel, in the valley of Curico, seams and veins of oligistic oxide of iron and of hematites of great purity have been worked for use as fluxes in the blast furnaces installed at Illapel. The town of Combarbala is nearly 60 miles from the village of Illapel and 650 feet higher in altitude. It is connected with Illapel by a railway, 42 miles in length. This harbor, which is indifferently sheltered from the southwest winds, possesses a dock, which with a little improvement, would allow of large shipments being made.

Provinces of Aconcagua and Valparaiso

Large deposits of magnetic iron oxide forming great masses of pure oxide traversed by sterile dykes and outcropping over a large territory, have been found in the department of Petorca, province of Aconcagua. The working of these ores would be easy and cheap, and with a few installations of aerial cables and of narrow gage railways, their transportation to Pichidangui bay should not present any difficulty. Pichidangui bay, although badly sheltered from the northwestern tides, with a little improvement, could accommodate large steamers satisfactorily.

Table IX.

	Iron, per cent.	Manganese, per cent.	Sulphur, per cent.	Phosphorus, per cent.	Copper, per cent.
Batuca ores (San Juan)	67.89	0.09	0.014	0.016	traces
Batuca ores (San Ramon)	65.64	0.09	0.031	0.01	0.03
Lampa ores	65.02	0.21	0.017	0.013	0.048
Batuca outcrops	63.91	0.27	0.025	0.054	0.085
Lampa outcrops	68.83	0.07	0.008	0.02	0.016

In the province of Santiago, a large number of iron ore deposits are known, but the difficulties and the

cost of transporting them renders exploitation impracticable at present.

In the department of Santiago, outcrops of iron pyrites are found at Tiltil, and pure oxide irons are found at Lampa and Batuco. Analyses of these ores made at the school of mines in Paris yielded the results shown in Table IX.

These ores, the deposit of which does not appear to be very extensive, might later assume some degree of importance for the manufacture of certain steels.

The chief iron ores of Parral are situated at San Manuel on the summit of a mountain 2,750 feet above sea level and some distance from Parrell. At Membrillos is a small cupola in which with wood charcoal and these ores, small quantities of good white pig iron have been manufactured experimentally.

Further south, in the region of Coronel and Araucania, numerous outcrops of iron ore have been described, but no serious prospecting work has been carried out, and the deposits occur, generally speaking, at a considerable distance from the coast and even from the railways.

The deposits purchased by the Bethlehem Steel Co. are situated in the province of Coquimbo, department of Serena. The mines are 4 miles west of the Higuera copper district and 4½ miles from Cruz Grande bay, which is a harbor, 3 miles north of the town of Totoratillo. The Tofo concessions cover an area of about 215 acres.

This deposit has been proved only by some survey shafts and by a few cross cuts, but its sedimentary origin justifies the expectation that at greater depths and at the center of the mines the same ores will be found as at the surface. The engineers of the original French company endeavored to ascertain the probable cubical capacity of the deposits. Taking the density as only 4, the probable amount of 69,460,117 tons of ore is estimated.

The ores of these deposits include various oxides such as magnetites, oligists and hematites, resting upon country rock of either a compact granitic or talc schist structure, the latter being almost in the state of powder. Lumps of high grade iron ore occur on the surface in great abundance and of these numerous samples were gathered and analyzed, together with other samples obtained for survey shafts and cuttings incident to the installation of the wire ropeway. These samples averaged 68 to 69 per cent metallic iron, no sulphur, very little silica and phosphorus below 0.03 per cent.

A complete analysis of a large number of samples resulted as follows:

Peroxide of iron, 83.86 per cent; protoxide of iron, 12.60 per cent; alumina, 0.70 per cent; silica, 1.35 per cent; combined water, 0.99 per cent; lime, 0.18 per cent; magnesium, traces; manganese oxide, 0.20 per cent; sulphuric acid, 0.05 per cent; phosphoric acid, 0.03 per cent; which corresponds to: Iron, 68.50 per cent; sulphur, 0.022 per cent; phosphorus, 0.013 per cent, and original moisture, 0.39 per cent.

The methods of working are exceedingly simple and can be effected by open-cast quarrying, proceeding later, as in Sweden and Norway, by terrace workings of 30 to 60 feet in height, and the total cost of extracting and breaking up the blocks will not exceed 21 cents a ton.

As long as the distance does not exceed about 300 yards, the broken ore, or the ore strewn on the surface, can be transported to the central station of an aerial ropeway, and subsequently, by an aerial ropeway, for a distance of about 4½ miles from this mining center, to the bay of Cruz Grande. The difference in the level between the mine and the Bay of Cruz Grande is 2,295 feet, which allows the buckets to descend by gravity, and furnishes valuable surplus power.

This aerial ropeway has a present capacity of 40 tons per hour. For loading, there has been installed in the bay of Cruz Grande, which is well protected from the northern and southern winds, but is open toward the west, a quay with a bridge 37 yards in length, which enables vessels to approach below the quay and to receive their cargoes direct by means of a hopper and an iron chute. Loading may be effected at the rate of 1,000 tons daily.

It is believed possible to load 250,000 tons of ore annually and later, by means of further handling facilities, to increase this exportation to 1,000,000 tons. At the present time the iron ores obtained from Tofo are employed to supply the metallurgical works at Corral, and for export, several boat loads having been sent to Great Britain and Germany. Without definitely estimating the cost price, it may be said that the exceptionally favorable conditions of the Tofo mines, from the point of view of their easy exploitation and their proximity to the sea coast, will allow of loading ore at an exceedingly low price.

The works at Corral consist of two blast furnaces equipped with seven Cowper hot blast stoves and were built at a cost of approximately $2,500,000 by the French owners of the Tofo mines. These two furnaces are situated about 1,000 yards from the pier at the port of Corral, and the ore is brought from the pier to the furnaces in cars of 10 tons capacity. These cars are loaded by steam derricks.

Scientific Selection of Employes[1]

By Dr. Katherine M. H. Blackford

The largest sums of money, the finest materials, the latest and best equipment, the most cleverly and intelligently devised methods will not be efficient unless there are men fitted by nature and training for their tasks, in the right places, at the right time, and with the right training, guidance, direction and supervision.

The logical beginning, therefore, for an efficient organization is the scientific selection, assignment and handling of men. Notwithstanding this obvious truth, we find haphazard methods almost universal.

In industrial plants it is the general rule to leave selection to foremen, many of whom have been chosen for almost any other reason than their real fitness for their positions. In stores, banks and offices the methods of selection are nearly as unscientific, the most common being the old wasteful one of "hiring and firing."

Perhaps the climax of inefficiency of selection is reached in the case of a large concern recently brought to my attention. Applicants for shop positions are lined up and the superintendent makes his choice by feeling their muscles and engaging those who have the largest and hardest.

A man's value to his employer is not in his large bones and muscles. Human muscle power is the most expensive form of energy used. A man is valuable in proportion to the thought, the physical inspiration and the happiness he puts into his work. A man doing work he does not love

[1]From a paper presented before the Efficiency Engineering Society.

lacks enthusiasm, spontaneity, interest and concentration—therefore, efficiency.

The average man in every walk of life has chosen his work—if, indeed, he can be said to have chosen it at all—without vocational guidance. Some have been started upon their careers by fond, but mistaken and oftentimes stubborn parents. Others have been compelled by economic necessity—or what they considered necessity—to drop into the first available opening.

Choice of Vocation

With a hundred different vocations from which to choose, the probability of finding the right one by such merely chance methods is obviously but one in a hundred.

The fact, therefore, that a man applies for a certain kind of work is not sufficient indication that he is fitted for that work, and will, therefore, be efficient and happy in it.

All are familiar with the waste of precious human values suffered by both employers and employes as the result of the present haphazard and unscientific methods of selecting, assigning, and handling the world's workers. Here, indeed, is a vast and practically untouched opportunity for the conservation of our most priceless national resources.

However, we Americans are so intensely commercial and so shortsighted in everything except money values that to induce universal acceptance of any idea we must hear the jingle of coin and see the glitter of gold. Happily this problem of fitness touches our purses so unmistakably as to be appreciated by the most utilitarian and egotistic.

While we cannot yet give every child competent vocational guidance and educate his parents to co-operate with him and us, we can make, and have made, a profitable start in that direction by selecting and assigning men and women according to their inherent fitness for the work they are to do, thus accomplishing three desirable results, that is, making them more efficient and happier, increasing the profits of their employers, and demonstrating the practical application of scientific selection.

Adaptability of Employes

This has been done through a properly equipped employment department in charge of expert character analysts who interview, select and assign men.

One of the most important functions is readjustment of the workers already employed. Frank G. Gilbreth has said: "The mere fact that a man does not come up to the standard required on a certain job is no sign that he cannot make good at another. I have in mind one man who failed signally at several jobs, but finally hit his pace and became one of the best men I had."

In many organizations there is an unwritten law among foremen and department heads that if a man is unsatisfactory in one department he is not to be employed elsewhere. This is unscientific, wasteful, and discloses a narrow, prejudiced, and wholly selfish point of view.

Not only may a man who is a failure at one kind of work be successful at some other work, but shifting him from the influence of one foreman and placing him under another who is more congenial may make a difference of 50 per cent in his efficiency.

Individual Examples

I have in mind a man who seems to be almost idiotic mathematically. He can scarcely add two and two together and get four for an answer; nor is it easy to make him understand why two and two equals four when the problem is worked out for him by someone else. Yet this same man can read Greek, Latin, Hebrew, Swedish, German, French, Italian and English rapidly and accurately. He is a ready and forceful writer in all of these languages. If this man were placed in the accounting division he would be summarily discharged as an incompetent, but in the sales department, handling foreign correspondence, he is invaluable to his concern. Yet the father of this young man once insisted that he become a bookkeeper!

In a large concern where scientific employment is now in use, a revolutionary change for the better in the very atmosphere and spirit of the whole organization was speedily accomplished, at the very beginning of the work, by replacing five high executives who were unfitted for their position with men scientifically-chosen for their particular fitness and efficiency. Labor troubles evaporated, hard problems of long standing were easily solved, harmony in the organization took the place of discord, and production leaped within a few weeks to a higher point, both in quantity and quality, than ever before. Such results could not have been attained in years by working from the bottom up.

The executive sounds the keynote for his department. If he is inefficient, he demoralizes all his workers. Indeed, very capable men will not continue to work under him. If he is himself efficient, he will secure good results from even ordinary workers and splendid results from good workers, while those who are incapable of advancement will gradually slough off.

Any science which reveals the physical, mental or moral nature of man contains valuable data for judging of the particular physical, mental, and moral character, development, qualifications, and aptitude of any individual.

It is a law of nature having universal application that the size, color, form, proportion, texture, consistency, and structure of an object indicates its functions and use.

Natural Aptitude

The same law is applicable without modification to human beings.

It is obvious that size of body fits or unfits a man for a given kind of work. If the work requires covering great distances, the short, stout man is sorely handicapped because he is not built for easy locomotion. On the other hand, much stooping or bending is difficult for the tall, rangy-built man.

Blondes and brunettes do not work in the same manner. They naturally incline to different lines of work. Generally speaking, blondes are speculative and optimistic; usually mild and good-natured; often inventive; like to conceive the idea or plan for someone else to work out. They naturally incline to aggressive work, such as salesmanship, advertising and promotion.

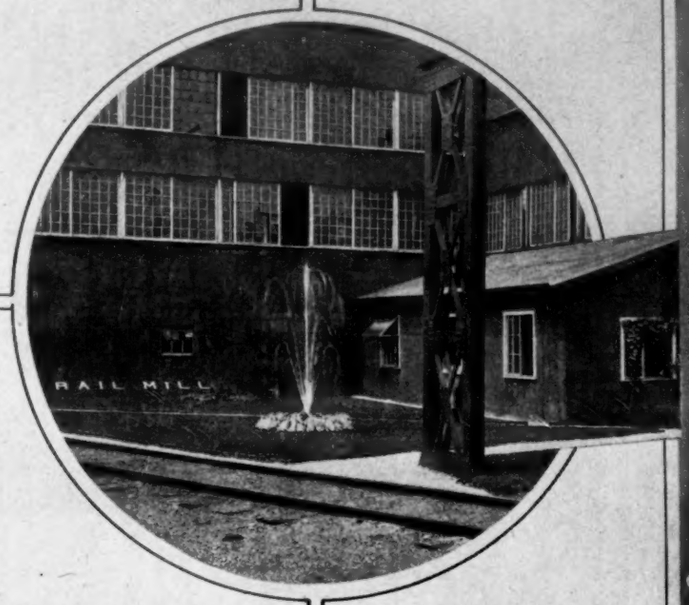
General Types

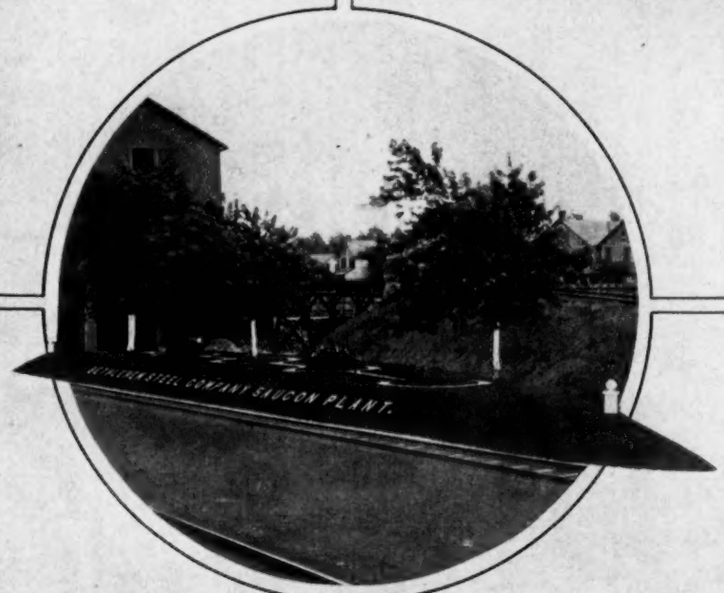
Brunettes incline to convervatism rather than speculation; often serious-minded; sometimes inclined to gloominess; like to work out and perfect the plan which some other mind has conceived.

Second, we study expression, which reveals itself in language, voice, gesture, handwriting, the eyes, the walk, etc. Expression tells us what the man has done with his inherited qualities and what habits he has acquired.

Third, we must analyze accurately his thoughts and actions, checking them up with his natural aptitudes and acquired habits.

Knowing thus how to recognize in the individual inherent capacity, natural aptitudes and acquired habits of mind and body, and being familiar with the requirements for any particular task, it is comparatively easy to fit the two together.





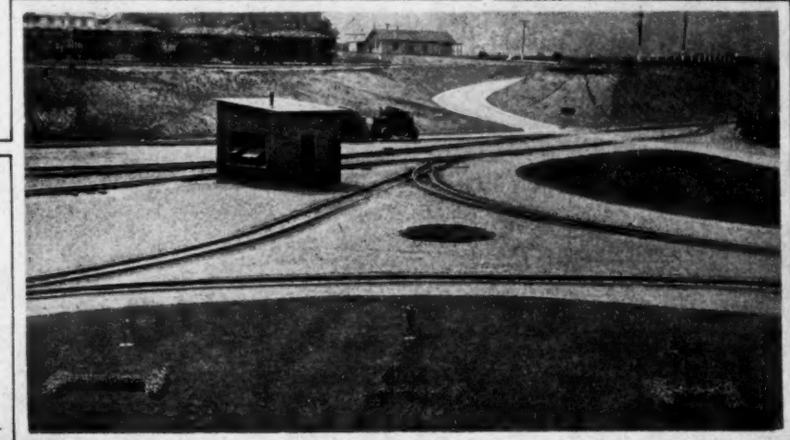


FIG. 1—VIEW AT THE FINISHING END OF THE SPECIAL STRUCTURAL MILL AND FINISHING DEPARTMENT OFFICE

FIG. 2—RAIL MILL FINISHING DEPARTMENT

FIG. 3—GRASS PLOT AND FLOWER BEDS AT THE LIME BURNING PLANT

FIG. 4—VIEW FROM SAUCON PLANT OFFICE LOOKING TOWARD THE ENTRANCE

Attractive Yards of the Bethlehem Steel Co.

Well-Kept Drives and Walks, Grass Plots and Flower Beds, Artistically Arranged, Make These Yards Inviting

The landscape gardener and the steel works engineer seldom are called into consultation on the same project, yet it would seem that the landscape artist has done his work unusually well in making the yards of the various departments of the works of the Bethlehem Steel Co., South Bethlehem, Pa., both attractive and inviting. In a recent issue of the magazine published by the American Iron and Steel Institute is contained an interesting article entitled "Modern Yard Conditions at the Bethlehem Steel Co.'s Works", written by Dr. Thomas Darlington, secretary of the welfare committee of the institute. This is accompanied by a large number of illustrations, which are presented herewith, illustrating what may be done in the artistic arrangement of steel plant yards.

Dr. Darlington's article, in part, is as follows:

"The two great causes to which are attributed the health of an individual are heredity and environment. The study of the first is called eugenics, and of the second euthenics. This latter term Ellen H. Richards has defined as 'the science of controllable environment'.

"Both eugenics and euthenics should be the concern of every community. Particularly is the latter of interest to every manufacturer and to all who are concerned with labor and production. Most particularly is it of interest to the worker himself.

Importance of Environment

"It is a common saying that labor is ennobling. It is not so common to hear it said that labor is healthful.

"It is natural for us to work. We have the testimony of thousands who have lived long and useful lives that one's greatest happiness is to be found in work. Physiologically, work is an important factor of longevity. To create is the supreme appetence of the human race. But in order that work may be healthful and productive of happiness, much depends upon the surroundings. It is not alone sufficient that the worker be protected from dust and poisonous fumes and other factors that play so important a part in the hygiene of an industry; it is also very important that the surroundings be bright and cheerful.

"All persons, no matter what their station or walk in life, are subject to the psychologic influence of pleasant surroundings. Who does not feel the difference between dull and cloudy days and those that are bright and sunshiny?

"In sickness the removal of a patient from a wretched environment to cheerful surroundings, or even the gift of a single flower to a child with some serious illness, often affects the whole course of the disease, and may

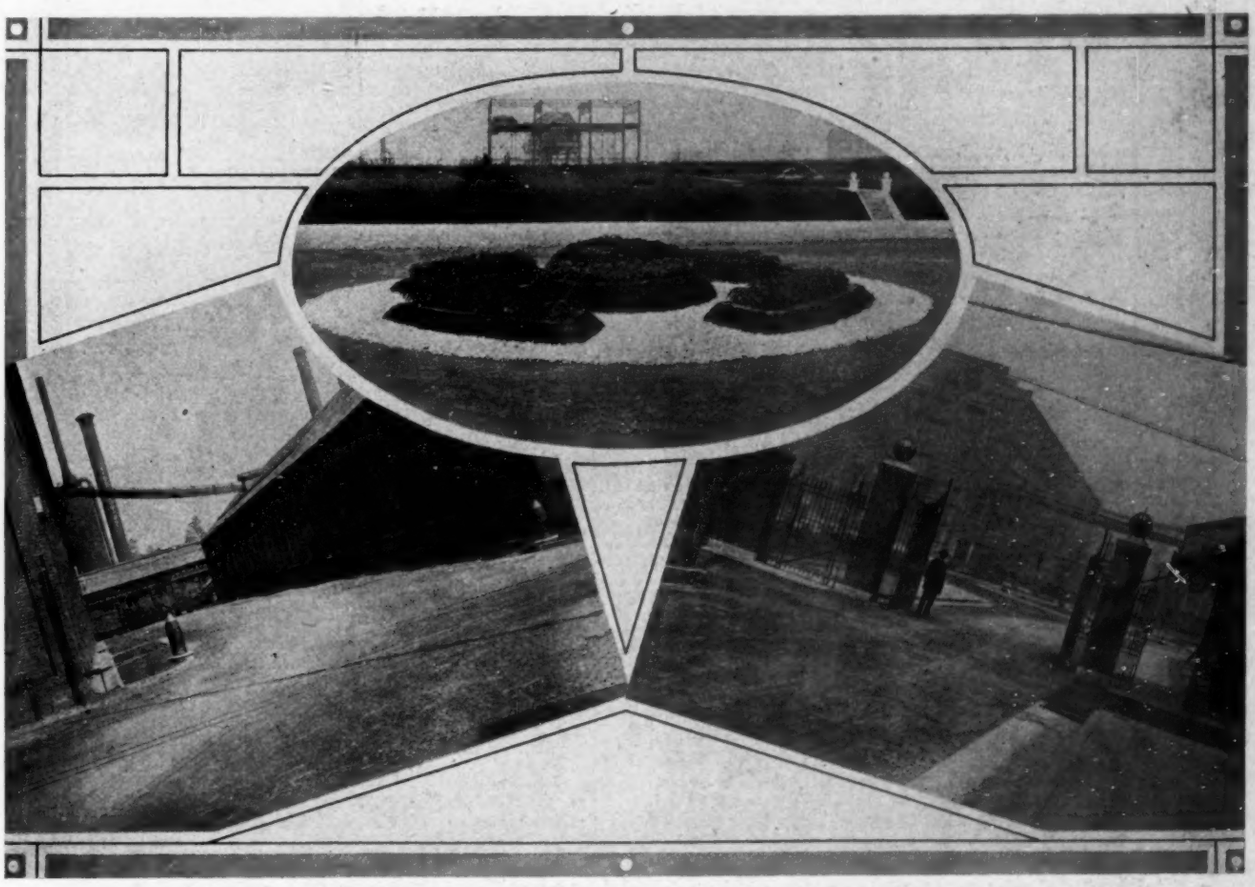


FIG. 5—VIEW AT THE END OF THE ENTRANCE OF THE SAUCON PLANT OF THE BETHLEHEM STEEL CO.

FIG. 6—ENTRANCE STREET TO THE LEHIGH PLANT OF THE BETHLEHEM STEEL CO.

FIG. 7—MAIN ENTRANCE TO THE LEHIGH PLANT OF THE BETHLEHEM STEEL CO.

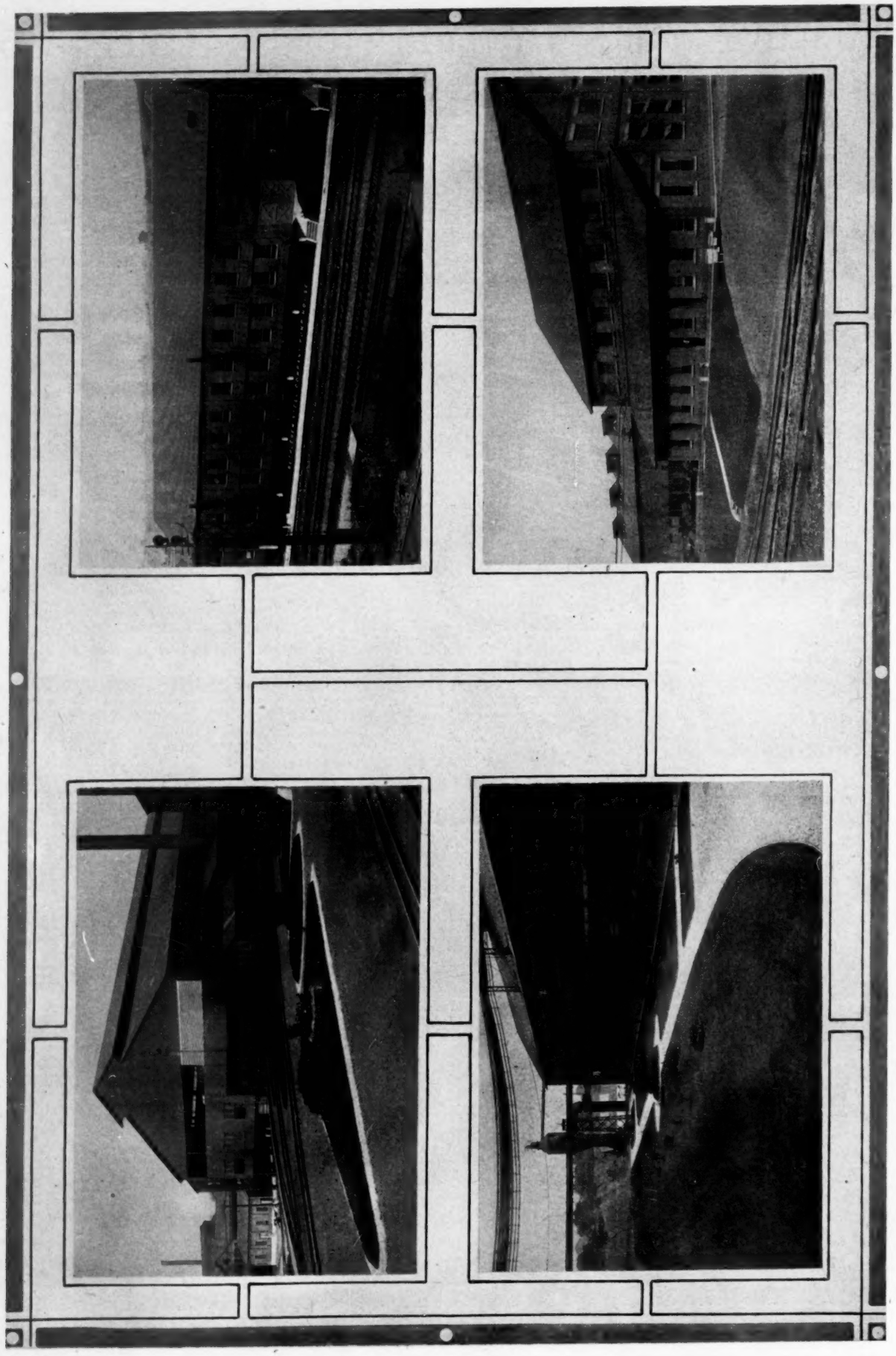


FIG. 8—YARD OF NO. 2 OPEN-HEARTH PLANT OF THE SAUCON WORKS

FIG. 9—THE BETHLEHEM STEEL CO.'S PUMPING STATION

FIG. 10—POWER HOUSE, SAUCON PLANT OF THE BETHLEHEM STEEL CO.

FIG. 11—BLAST FURNACE OFFICE AND REPAIR MACHINE SHOP OF THE BETHLEHEM STEEL CO.

make the difference between a fatal result and recovery.

"While many investigators seem to doubt the effect of environment on future generations, all recognize that it has a most decided effect upon individual life. The mind undoubtedly exerts a most potent influence upon the body. This is well shown in the violent beating of the heart, and the blanching of the face in case of fright.

"Every physician knows that the mere fact of his presence and the encouragement thereby given the patient, is more than half the battle.

Co-operation Necessary in Solving Health Problems

"As a nation and as individuals, we are constantly confronted with profound economic problems, many of which have never been satisfactorily solved, many of which are new.

"As sparsely settled communities have become villages and grown to cities, as workshops have enlarged from small beginnings to industrial corporations, there have come with the density of population new responsibilities, many of which did not exist before. Such, for instance, are those involving the health of the community.

"The responsibility for solving these health problems is divided among three groups:

"1.—The people themselves, who should take care of matters of personal hygiene.

"2.—The company, chiefly within the limits of its work.

"3.—The community or the state, in making and enforcing health laws.

"This responsibility is so interlocked among the three groups that it is sometimes difficult to know where the duty of one commences and the other leaves off. The problem can never be successfully solved without co-operation, and if co-operation is to exist it can only come through education, the education of all concerned.

Necessity of Education

"The great causes that underly the misery of the world are said to be ignorance, prejudice, neglect, poverty, sensuality and appetite. But if I were to indicate what seems to me to be the greatest in this network of associate factors, that which obstructs most the path of social reform, that which is responsible for more than half of the world's troubles, I would say ignorance. Schopenhauer expresses it conversely in saying that nine-tenths of our pleasures come from education. If this be true, how very important is education in solving the fundamental problems of human life.

"But how shall people be educated? There is no method of education so potent as that received through the eye. Example is stronger than precept.

"Working in clean and orderly yards is not only more pleasant, but also more safe. How frequently have nails in planks been the direct cause of injury? How often have people fallen upon fruit skins, or stumbled over blocks of wood! And in a busy yard, with the moving of engines and the swinging of cranes, to fall may mean bodily injury.

"The illustrations accompanying this article are reproductions of photographs taken in the summer of 1912, showing yard conditions at the plants of the Bethlehem Steel Co.—yard conditions that are unexcelled in the industry anywhere.

"A visitor to the Bethlehem works last summer jokingly asked the general manager, Mr. Grace, whether they were making steel or raising flowers. Mr. Grace answered, 'We are primarily engaged in making steel, but we make better steel and more of it by also raising flowers and having them in our yards'.

"Here was the deliberate judgment of a hard-headed, practical business man. The answer did credit alike to his heart and his head. It not only revealed a humane disposition but also expressed a profound economic and hygienic truth.

Influence of Good Example

"The making of iron and steel is no parlor employment. It demands strength of body and mind. Smoke and dirt have seemed unavoidable. The works have naturally been surrounded by cheap and unattractive tenements. The very fact that flowers will grow in a steel plant yard is proof that many unhygienic conditions have been eliminated. Clean yards and grass plots and flowers within manufacturing plants have a very beneficial effect on the minds of the men. That this has a reflex effect on the homes is shown in hundreds of cases. For the beauty of order and decency is persuasive everywhere, and few people can resist it.

"With proper environment, with the creation of right conditions, with the proper adjustment of work and recreation, the performance of one's daily duties may come to be regarded as promotive of the highest kind of joy."

A view of the finishing end of the special structural mill and the finishing department office, is illustrated in Fig. 1. The grass plot is broken by three flower beds surrounded by cement walks and the conveyor from the mill to the structural yard is surmounted by a raised platform and stairway to insure the safety of employes in crossing the conveyor.

Fig. 2 is a view outside of the rail mill finishing office and shows one end of the rail mill building. The department is indicated by the words *rail mill*, outlined in white letters on the lawn, which is broken by a flower bed and a fountain.

Beds of Flowers

The grass plot and flower beds in front of the lime burning plant are illustrated in Fig. 3. The beds of flowers are surrounded by gravel walks and the entire plot is in the form of a V to conform to the outline of the two tracks on either side of the building.

A well-kept yard, broken by industrial and standard gage tracks, is shown in Fig. 4. The space between the tracks is covered with gravel and on the grass plot in the foreground are beds of evergreen plants in the form of rail sections. This is a view from the Saucon plant office, looking toward the main entrance to the works.

The entrance to the Saucon plant is particularly artistic and inviting. In the center of the road leading to the office is a large bed of flowers, as illustrated in Fig. 5, and in the background is shown a large grass plot with a winding walk.

The entrance street to the Lehigh plant is guarded by an exceedingly artistic iron gate, as shown in Fig. 7. The winding drives and walks of the plant yard leading to the various departments are well arranged, and scattered about are beds of plants and shrubs.

Between the tracks leading to open-hearth plant No. 2 of the Saucon works are many prettily arranged grass and flower plots, as illustrated in Fig. 8, while Fig. 9 is a view of the Bethlehem Steel Co.'s pumping station.

Terraced Lawns

Fig. 10 shows the terraced lawn in front of the Saucon power house with its winding walks and flower beds. The blast furnace office and repair machine shop is illustrated in Fig. 11. Here, too, the landscape gardener has succeeded in making attractive a section of the steel plant which ordinarily is littered with broken machinery, scrap and an accumulation of odds and ends that are unsightly and do not lead to a spirit of orderliness on the part of the employes.

Notable Developments in Machine Shop Practice

Report of the Sub-Committee of the American Society of Mechanical Engineers, Which Details Wonderful Advances in This Work in the Last Decade

The operation of metal-working tools and their productive capacity are as much matters of machine design, arrangement and management as of individual skill. In fact, productive capacity in the past depended very largely on the skill and initiative of the workman, but now the rate of production in many branches of manufacture is almost entirely governed by the construction of machines, so that the designer, when viewed in this light, is closely allied with shop practice. The transference of skill by the machine designer from the operators to the machines has embodied in the latter much of the accumulated experience of many mechanics working on simpler and more primitive tools. So it may be asserted that much of the improvement in machine shop practice has appeared in the improvement of machine tools themselves in one way or another.

Classification Difficult

When it is considered that machine shop practice embraces a wide variety of work, ranging from the smallest to the largest manufactured products, and all kinds of repair work, the difficulty of classifying and differentiating it can be appreciated. Locomotive repair work, for example, is in a class by itself in which peculiar methods have been developed, differing radically from those followed in doing similar work in other lines. The slotter, for example, is a machine tool in high favor in railroad shops and, outside of shipyards, has been little used elsewhere. It is, however, slowly coming into use in manufacturing plants. The milling machine until a few years ago had not gained a foothold in railroad repair shops, largely because it was and still is not as well adapted to handle the general run of plane finishing required in these shops as the planer and shaper. The latter are adaptable machines peculiarly suited to non-repetitive operations, while the milling machine excels in manufacturing.

One of the noticeable changes in machine shop equipment during the past 10 years, is the increased weight and power of machine tools, which was made necessary through the general application of high-speed steel cutting tools. While the increased capacity of machines which followed in the wake of the application of high-speed steel was directly instrumental in bringing about such increases in the weight of machines, the result has been beneficial, not only in increased production but in accuracy of product, because of greater rigidity and consequent better preservation of alignment.

Progress also has been made in the methods of erecting machinery. With large size machines the foundation plays a most important part in the accuracy of the work produced. For instance, the provision of a massive, well-built foundation for large planers is imperative. When not provided, the weight of the machine and work must inevitably cause settling and springing out of shape. Every mechanic knows that such a disturbance of the foundation affects the alignment, which means that the work produced on the planer will be inaccurate. The elimination of defective action due to want of support, and the increased mass and rigidity have in the case of planers resulted in the production of plane surfaces closely approaching theoretical planes when the work itself affords the necessary rigidity and uniformity of section. Hence, hand-scraping to perfect alignment is not as necessary as it was a few years ago and it may be said that on some classes of work scraping is now largely more of an ornamental than a corrective process. On high grade machines, however, scraping or grinding probably will continue to be necessary to correct inaccuracies of surface alignment.

Electric Motor Drive

The subject of electric motor drives was given much prominence in discussions of machine shop practice a few years ago, the bias being generally in favor of individual motor drive. While subsequent experience has shown, that the direct-connected electric motor has certain limitations and disadvantages for some classes of work, it also has shown that the same results and efficiency cannot be obtained with the group system of driving modern designs of machine tools. The investment in motors is less with the group system, but the flexibility of the independent drive is lost. When a machine driven by an independent motor is properly equipped for easy handling, increase of production over that of the same machine in a group system is practically insured. One machine tool builder has found it a good rule to apply independent motors wherever the power requirement is 5 horsepower or more. Hardened steel gears in the driving train reduce gear troubles to a minimum. When the character of work is constantly changing and new groupings of machines are required from time to time, the individual drive is at great advantage.

Improvements have been made in the characteristics of variable speed and reversible motors. Automatic controllers have been introduced which make the stopping and starting of machines simply the matter of pushing a button. These devices protect the motors, save time and protect the machines from shocks.

Automatic Machines

Progress has been made in the development of automatic and semi-automatic machines for the production of duplicate parts from bar stock, iron and brass castings. Many special fixtures have been designed for automatic screw machines which have widened their scope to include a great variety of small parts on which a number of operations must be performed before cutting off from the bar, such as small spiral gears, capstan screws, etc. The cost of production is so greatly reduced that these machines are generally applied where the quantity of work to be produced warrants the cost of installation and tool maintenance. The scope of other types of automatic machine tools is wide and constantly increasing. Certain examples will be mentioned later. Many pages could be devoted to the improvements in these machines alone without exhausting the topic; but attention is called here to the simplification of equipment required for the manufacture of highly developed specialties because of the possibility of buying the bulk of the parts from screw machine product specialists. A manufacturer of a specialty can, if he chooses, organize on an assembling basis, confining his actual manufacture to the making of a few principal parts. This development is having a marked influence on our export trade.

Modern methods of manufacturing are responsible for limiting the employment of men to specific operations only, and pursuit of the plan is making it hard to secure all-around machinists. Young men come into a factory and soon acquire the necessary skill to become proficient drill press operators or milling machine operators. They are able to earn fairly good wages in a shorter space of time than if they served the necessary term of apprenticeship to become competent all-around machinists. The endeavor has been made in the larger manufacturing cities to offset the narrowing effect of specialized training by the introduction of training schools in which young mechanics are given instruction in the theoretical side of their work. The results obtained by this training are beneficial. Men are acquiring both theoretical and practical knowledge, so that to a limited extent at least, they are obtaining the benefits of a technical education coupled with practical training.

One of the noteworthy improvements in modern shop practice is the application of the principles of scientific management. While the details and elements that make up the complete system advocated by Mr. Taylor are not widely used in full, undoubtedly the fundamental principles are coming to be more thoroughly understood and are being quite generally applied. Some of the more specific improvements referred to in the following may not be strictly modern, but doubtless most of them can be so classified because they are now common, whereas 10 years ago they were found only in comparatively few shops.

The turning and planing tools in many shops are now ground to standard shapes in the tool room on special tool grinding machines. This method not only saves the time of the machine tool operator, but insures the grinding of all tools to the correct form and it also saves what is of greater value—the loss of the productive time of the machine tool. The stock of tools required for a shop is also much smaller.

Checking System for Small Tools

Most shops at the present time keep all small tools in the store room, except those in actual use. In this way, the tools are kept in good condition and a much smaller stock is required. Not many years ago it was quite common for each workman to have his own stock of tools. Consequently there were good tools and poor tools just in proportion as there are good workmen and bad workmen. For instance, a lathe operator had his own stock of mandrels which were made to suit each particular job, and when necessary one man borrowed from another. The result was that the workmen wasted a great deal of time wandering around looking for mandrels and other anxiliary equipment. It may seem somewhat out of place to refer to this well-known method of handling small tools by a checking system in a paper on modern improvements, because it is an old feature of many shops.

In some shops in which scientific management has been applied, and where the work in connection with each operation is planned in advance, it is the practice to make up at the time the work is planned, a list of the tools that will be required for the performance of each operation, this list being sent to the tool room in advance of the time that the tools will be required, and the tools delivered to the workman by a tool carrier, thus saving the time of the workman as well as that of his machine.

Fixed Speeds and Feeds

The important questions of speed and feed in connection with machining operations have, during recent years, been carefully studied by many superintendents and foremen who formerly relied entirely on the judgment of the workmen, which was sometimes good and sometimes bad. Speeds and feeds are fixed in the planning department and are based on the power of the machine and character of the metal.

More thought is now given to the selection of machine tools for various classes of work. A few years ago, many shop foremen used a certain type of machine for a given class of work, because that type had always been used for that purpose. It seems that there is much less conservatism today and precedent does not count for as much as it did a few years ago. The tendency is to design the machine for the work instead of adapting the work to the machine equipment.

Machine parts are now carefully inspected in many shops by an independent inspection department, whereas formerly the only check on the accuracy of machined work was in the erecting department — if everything could be assembled, the work was considered satisfactory. The more exacting requirements of recent years, however, made necessary the general adoption of a rigorous system of inspection. Thorough inspection and testing are necessary features of interchangeable manufacturing methods; tools and system have become highly specialized. In the manufacture of firearms and other high-grade products from 50 to 100 separate tests or gagings on a single part are not uncommon.

In some shops doing work of a miscellaneous character, it is the practice to have an inspector go to the machine at the time a job is started to make sure that the workman understands all of the requirements with reference to the quality required in the work that he is to do, instructing the workman as to the degree of accuracy required, the kind of finish, etc., and seeing that he does not make a mistake in reading his drawing, setting his measuring tools, etc. The inspector inspects the work done in the operation in question upon the first piece where there are several pieces to be done, thus avoiding the danger of an error being made on the first piece being repeated on all subsequent pieces. An inspection is also made upon the completion of each operation of the work done on all pieces in the lot for the purpose of detecting any error that may have been made, so that steps may be taken for its correction without delay.

The increasing use of tools in multiple is a feature that is noticeable in connection with the modern machine shop. Milling machines are now quite extensively used having several spindles, making possible the finishing of three or even five sides of a casting at one setting, many holes are drilled simultaneously and in practically the same time formerly required for drilling one hole, and so on.

The up-to-date foreman or superintendent has come to realize that the efficiency of his shop depends largely on the amount of attention given to the little things. The furnishing of proper clamps and bolts to machine tool operators is a case in point. Poor bolts and warped clamps around a machine often double the time required for setting-up work. At the present, most shops are equipped with proper clamping facilities and, in many cases, clamps of the right shape and bolts of the right length are furnished for each particular job, along with the other tools, such as cutters, reamers, etc.

Location of Tools and Lighting

More attention is given to the relative location of tools in the shop, in order that all machining operations can be performed with no unnecessary handling of the work, the aim being to finish parts by advancing them from one tool to another in a direct

line without any see-sawing or useless movements. Shops are constructed so that the light will be properly diffused, which makes it easier for the machinist to do accurate work and reduces the amount of spoiled work. The physical comfort of the workmen also is receiving more and more attention.

Drilling Machines

High speed steel has been substituted for carbon steel in the manufacture of twist and flat twist drills with marked improvement in capacity. The speed of drilling has been increased two or three times, if not more. The drilling machine, the most common machine tool, has been redesigned to meet the new requirements and so rapid are some of the most highly developed machines on the market, that holes can be drilled in boiler plate quicker than they can be punched.

The claim is made by engineers who have carefully investigated the problem, that 80 per cent of all the holes drilled in general manufacturing are ¾-inch in diameter or less. The fact is pointed out that general purpose drills with a capacity of from ⅛-inch to 3 inches are not efficient except within a narrow zone somewhere between the two extremes cited, desirable as they are when on deep drilling or on large diameters requiring a geared drive. Hence the general recognition of the importance of comparatively small capacity drilling machines in the equipment of efficient plants.

Multiple drilling machines with from 2 to 50 or more drills in operation simultaneously, have been developed. Inverted drilling machines with which the capacity of drills is increased largely because of the rapid clearing of chips from the holes are being used with satisfaction, also multiple drilling machines working in several planes simultaneously, making feasible the drilling and reaming of all holes in machine parts such as automobile cylinders at one operation. Another development is the rotary table, semi-automatic drilling machines which relieve the operator of lifting and lowering the spindle and engaging and disengaging the feed.

Roller Grip Drill Chuck

A minor improvement of machine shop equipment which has increased the productive capacity of single-spindle drilling machines is the so-called roller grip drill chuck which enables the operator to insert and remove drills, reamers, counterbores and other tools without stopping the spindle. These chucks are useful for certain kinds of work requiring drilling, reaming and counterboring operations. In the same connection, mention should be made of tapping attachments, stud setting chucks, drill speeders, and similar attachments which improve the working range of drilling machines.

The need of the old style reversing countershaft has been eliminated from drilling machines by automatically reversing tapping attachments, automatically opening stud-setters, and many screw-threading operations are now performed on drill-presses with special forms of automatically opening dies, at a great saving over the former method of chucking the work on a turret lathe.

The improvements in lathes have been chiefly in matters of strength, power, and details of construction. Spindles are made larger and are supported in longer bearings, improvements have been made in carriages, tailstocks, toolrests, apron mechanism, stops, ways, spindle noses, gear boxes, change gear and feed mechanisms, etc. Three-step cone pulley and double back gear headstocks have been widely adopted for high-power rapid reduction lathes, this construction providing a wide range of speeds with simple and efficient mechanism. Quick change gear mechanisms which enable the selection of gear combinations for screw thread cutting to be made practically instantaneous, have been generally provided by lathe builders. The demand for simple lathes, that is lathes without change gears, lead screws and other standard features of complete engine lathes, has not been insistent.

Wheel Lathes

A remarkable increase of efficiency has been made in locomotive driving wheel and car wheel lathes. Ten years ago, turning the tires of two pairs of drivers was a good day's work, and most railway shops did much less. High-speed steel has worked perhaps one of its greatest triumphs in this field. Tire turning lathes have been developed to equal the capacity of the best steels and the productive capacity has been increased to 8 or 10 pairs of drivers a day. The increase of capacity of steel tire car wheel lathes is even more marked, having been raised from five or six pairs to 18 or 20 pairs a day.

A weak feature of planers and a serious limitation to the power of large planers, is the common shifting belt reversing mechanism. On small planers even the shifting belts are objectionable because of slipping and the characteristic squeaking noises, but on large planers their fault is of more serious nature. Wide belts necessary to transmit the required power at practical speeds cannot be shifted quickly from the tight to the loose pulleys and vice versa. Clutches of various designs are used with varying degrees of success. The reversing electric motor, direct-connected to the planer drive, has been developed to the point that makes its success assured. Probably this change of drive is the most marked improvement in planers made in recent years. Many details have been improved and the greater strength and rigidity of the modern planer coupled with excellent workmanship insures accurate work.

Milling Machines

A change in the machines for producing plane surfaces has been going on gradually, but surely. Planers, shapers and slotting machines are being displaced by various types of milling machines in manufacturing plants. As plants change from a building to a manufacturing basis, the superiority of the milling machine as a manufacturing machine gives it the preference. The development of coarse-pitch teeth milling cutters and of face milling machines, are two of the marked improvements.

Single pulley drive with which the maximum power capacity of a given width belt can be transmitted to the machine irrespective of the work spindle speed, and geared speed boxes giving a wide range of positive speeds are other important changes in design. The vertical spindle milling machine has been developed to a high plane of efficiency, especially for small work. Rotary table machines with quick action clamping devices revolving continually while the operator places the work in position and removes the finished parts, are coming into extensive use.

Characteristics of modern milling machines also common to other modern machine tools are convenience and ease of operation, starting and stopping levers being placed where the operator can grasp them without leaving his normal position; speed and feed levers so placed as to permit the operator to control the rate of cutting while watching the work; power traverse of slides on heavy machines, etc.

Boring Mills and Boring Machines

The boring mill has taken a commanding place as a machine tool for both light and heavy work. When equipped with turret heads and a proper complement of tools its productive capacity has been made sec-

ond to none. Convenience of operation, economy of floor space, compactness of design, adaptability to use of lubricants on cutting tools, are some of the advantages of this machine which have been emphasized in the new designs brought out in recent years. The builders have studied to find the best order of operations and equip with chucks and tools that produce an output far in advance of that possible 10 years ago.

The horizontal boring machine of the bed and carriage type which has been developed practically within the past 10 years, partakes of the characteristics of the lathe, milling machine and boring mill, and in the improved designs is superior to any one, for certain classes of work. One of many uses to which it is devoted is that of boring jigs and fixtures for interchangeable production. But not only is it useful for jig making, but is peculiarly well suited for manufacturing machine parts interchangeably without the use of jigs. This important fact enables machine tools and similar high-grade machines to be economically produced on the interchangeable plan during the very active period of developing the design.

Magnetism for holding steel and iron parts for grinding, planing and turning operations has been made useful, especially for thin parts that are easily sprung out of shape by ordinary clamping means. Magnetic grinding, planing and lathe chucks have come into common use in plants having up-to-date equipment.

Grinding Machines

The surface grinder, especially the vertical spindle type, has made great strides during the last few years. The improvements in cylindrical grinding methods are also worthy of mention, especially the use of the heavy-duty grinder for removing stock formerly removed by a second or finishing cut in a lathe. Grinding stock from the rough as in the finishing of drop forged crankshafts is also a good example of modern practice. The stage has been reached in cylindrical grinding practice which places the cylindrical grinding machine on a co-ordinate basis with the lathe as a tool for finishing cylindrical work. A feature of cylindrical grinding machines which has greatly increased productive capacity in multiple diameter work is the stop bar or semi-automatic measuring attachment which enables shouldered shafts, etc., to be duplicated without measurement. Machines for internal grinding of non-revolving work with planetary spindles provides for the economical and accurate sizing of engine cylinders and other parts difficult to rotate. Vertical grinding machines and rotary work-tables utilizing magnetic chucks or other quick action clamping means for quickly securing and releasing the parts to be ground have come into extensive use for high-grade interchangeable manufacturing. The development of the disk grinder from a mere smoothing machine to a place as a powerful machine tool of great capacity for finishing plane and curved castings from the rough is one of the most interesting phases of modern practice.

Gear-Making

The demands of automobile users for quiet running gears have imposed on gear makers conditions very difficult to meet. The limits of error in shape and spacing of teeth have been greatly reduced and coupled with the necessity of making highly accurate gears, often has been that of producing them from tough alloy steels, heat-treated after cutting the teeth. Hardened and case-hardened gears also are demanded with minimum limits of error.

The planing process has been generally substituted for milling in the manufacture of high grade bevel gears, thus producing theoretically correct tooth shapes instead of the approximation possible only by the formed milling cutter process.

Gear hobbing machines have been widely adopted for cutting spur and spiral gears, because of the greatly increased capacity and simplicity of operation. Machines and methods of cutting the teeth of integral herring-bone gears cheaply, have been developed, thus making this form of gear available for machinery generally in which it has not been commonly used because of high cost of the two-part type. The demand of automobile users for noiseless gears has led to grinding the teeth of gears after hardening to correct form, and form grinding generally, including splined shafts for automobile change gear shafts and similar parts. Progress has been effected in the making of gears by the hot rolling process, producing them thus with a minimum waste of material and of exceptional physical characteristics.

Small Tools

The design and manufacture of small tools have been improved principally in details. There has been a tendency to decrease the number of teeth of milling cutters, making possible heavier roughing cuts with proportionately less expenditure of power. While the extreme coarse spacing of the teeth advocated by some leading engineers has not been generally adopted, all manufacturers of milling cutters have, to some extent, modified the tooth spacing of their cutters. Several special milling cutters with inserted teeth have also been proposed and, to some extent, adopted. The tendency has been towards the design of easily adjusted removable blade type reamers, and several satisfactory designs have been brought out. The flat twisted high-speed steel drill has been commercially developed, and several modifications of it have been placed on the market. The main progress in tap making, perhaps, has been towards a more satisfactory shape of the flute, and several tap makers have made experiments in this direction.

In general, there has been an attempt to design inserted cutter tools to a greater extent than formerly. This activity has been prompted largely by the high price of high-speed steel which has made it necessary to make the cutters only from this material, while the body and shanks of the tools are made of machine steel. Many experiments have been made to find the steels best adapted for a given service and the best heat treatment for the selected steels. Improvements have been made in the tangs of twist and flat drills, adding strength sufficient to enable them to stand up to the requirements of high-speed drilling and drilling machines.

Micrometers and Gages

During the past 10 years, the micrometer has become a measuring tool of general use. As the result of the general use of the micrometer, one thousandth inch has become the unit of measurement for fixing limits, and a limit of one-quarter thousandth is not uncommon in grinding operations. Not only is there a great advantage in the matter of accuracy in the use of micrometers over the old style of calipers, set to a scale, but there is a considerable saving in time through their use, both in the matter of setting to size and in eliminating the element of uncertainty, permitting the workman to proceed with his work with greater confidence. So general has use of this unit become, and so convenient is it for small dimensions, that a strong movement is under way to make it the standard for measuring wire, sheet metals, etc., in place of the irrational and arbitrary wire and sheet metal gages. One of the largest electrical concerns abandoned the wire and sheet metal gage system in 1904 and

adopted the decimal system in which one thousandth inch is the limit for use in all specifications of wire, sheet metal, fiber, etc.

Standard length gages have been improved. The so-called Swedish gages are furnished under guarantee of error being not more than one one-hundred thousandths inch, per inch length, the limit of error being proportional to the length. Thus a gage one-tenth inch long has an error limit of one one-millioneth inch, and so on. Hence a stack of these gages presents an overall length accurate to limit of one one-hundreth-thousandth inch per inch of length.

Screw Threads

The so-called United States or Sellers standard screw threads have come into general use for machine construction during the past 20 or 25 years and have proved generally satisfactory for locomotives, cars, steam engines, and other typical heavy machinery, but the automobile brought a new condition for which the standard threads were not well fitted. It was found that the jar and vibration to which motor cars are subjected, speedily loosened the comparatively coarse thread screws and nuts threaded to these pitches, and the need of finer pitches was soon recognized. We now have the finer screw pitches established by the Society of Automobile Engineers, and the merits of these pitches have won them recognition in other lines of machinery, where for constructive reasons, pitches finer than the United States standard were desirable.

An important factor in shop work is the portable electric motor drilling and reaming machine which has been developed in several efficient forms during the last decade. These portable machines, supplemented with the pneumatic riveting, chipping and caulking hammers, have virtually revolutionized ship building, bridge building and structural steel work, and in the erection shop have wrought great changes, making possible rapid and efficient machine work on the parts as erected and thus saving labor and time through the elimination of transport to and from stationary machines.

Power Hack Saws

The first power hack saw machine was put on the market about 25 years ago. During the past few years the range and capacity of these machines has been greatly extended. They are furnished with quick-return stroke, relief action for back stroke, means for using the full length of the blade, angle chucks and other improvements that have made this humble machine a real machine tool of high efficiency and low operating cost. The blades are furnished at low cost and of great durability.

Press Working

Press working machines, punches, dies and other tools, have developed to an extent not generally realized by engineers in lines not affected. Here again the development of highly specialized methods of manufacturing automobiles has had a marked influence. Crank presses of 1,000 tons capacity are in use. Pressed metal forms of large size are a commonplace. But not only has the development been remarkable in point of size, but also in detail of manipulation. Parts requiring several operations, for example, are turned out by multiple plunger presses, one finished piece being formed at every stroke. An interesting feature of press work is that shapes are produced impossible of duplication by any other known process. In this respect, press work differs from most other machining processes; it is possible to duplicate, for example, lathe or planer work by hand tools, but not so many drawing and forming operations in daily use. A branch of presswork little known is the extrusion of shells, tubes, collapsible tubes, etc., of copper, brass and alloys. Extrusion of bars in many shapes used in manufacturing locks, small machines, etc., has become a large industry which has been largely developed in recent years. The possibilities of extrusion are practically unlimited, and this process in common with other metal working methods extensively used has an important effect on the practice of shops using the shapes in their products.

Heat Treatment

The advent of the high-speed steels and the alloy steels used in automobile gears, shafts and other high-grade machinery subjected to shocks has necessitated the development of furnaces and equipment for the scientific heat treatment of steel. Accurate determinations of quenching and annealing temperatures are absolutely necessary, and the pyrometer has become an indispensable instrument in the furnace room. Gas and oil furnaces have been greatly improved in the matters of efficient use of fuel and control of temperatures.

An effective process has been introduced extensively during the period covered, for welding heavy sections of steel and iron. The thermit process is being successfully used for welding broken locomotive frames, cylinders, crankshafts, propeller shafts up to any thickness and diameter. The fractures are soundly united by a steel bond applied *in situ* at a fraction of the cost of removing the parts, welding them in the smith shop, finishing in the machine shop and replacing. Hundreds of locomotive frames have been welded by this process with almost uniform satisfaction and at a saving of thousands of dollars for labor and loss of service.

Autogenous Flame Welding and Cutting

The development of oxy-acetylene and oxy-hydrogen welding and cutting torches has given the industrial world truly remarkable tools for building up or cutting apart. The welding of sheet metals is accomplished with speed and evenness hardly possible by any other process, and the cutting of steel or wrought iron is done close to the line and with such rapidity as to equal or exceed the performance of any machine tool adapted for the same work. Recent improvements make possible the cutting of all manner of shapes from steel plates up to 6 inches thickness so close to the outline of the pattern that a light finishing cut suffices to transform the piece into a finished die.

The prevention of industrial accidents has received wide attention in industrial establishments. In machine shops accident prevention is a relatively simple matter, but there are a few points of danger which have become generally appreciated and all of the better types of machines are equipped with guards to cover gearings, set screws, fly wheels and all moving parts not necessarily exposed. There are also certain general sources of danger which exist in practically all manufacturing plants and the general rules to prevent accidents from slipping ladders, piles of castings, elevators, etc., are being applied.

A report on an investigation into the possibilities of using crude oil in smelting, is being prepared by the United States bureau of mines. Much information has been collected, and experiments have been carried on with satisfactory results. The benefit to be derived from this work would mostly accrue to the California ore deposits, where the present high cost of coke and coal makes local smelting impracticable, while large quantities of residual petroleums find little use except for surfacing roads.

Cleansing Effect of Titanium on Cast Iron[1]

Researches Showing That Titanium Introduced Into Cast Iron Does Not Produce An Alloy Until Fixed Percentages Are Exceeded

By Bradley Stoughton

The chemical properties of titanium are in general similar to those of silicon with this difference: that titanium is more active in combination both as to the number of elements with which it unites readily and the number of different compounds formed with each. In some respects it is also far more energetic in its action than silicon, as for example: it unites with oxygen, nitrogen and bromine with so much energy as to become red hot.

What is now called titanium steel is not a true alloy steel in the same sense as nickel steel, manganese steel, etc., because the titanium is added for the purpose of cleansing and purifying the metal, and not with the expectation of producing new properties by its direct influence. On the contrary, when sufficient titanium has been added to produce a direct influence, the result has not always seemed favorable. Indeed, we may make excellent "titanium steel" in which not a trace of titanium can be found,—it having already performed its scavenging work and passed out of the bath together with the impurities it was commissioned to remove. The case is somewhat similar to that of manganese, which is added to almost all steels for the purpose of removing oxygen and sulphur, and neutralizing the effects of any traces of those elements which remain thereafter. Small doses of manganese are used for this purpose. However, when we wish to take advantage of the direct effect of manganese, we add some 15 per cent of the metal, and then get an entirely new result, which makes manganese alloy steel. Most of the titanium steel belongs in the first class, and not in the true alloy steel class. Indications are not wanting, however, that the direct effect of titanium on steel and iron may have its advantages, and the future will perhaps see titanium alloy steel used for many purposes.

Even when used for cleansing purposes, titanium hardens, strengthens and toughens steel, and this seems to apply to crucible and even electric steel, as well as to Bessemer and open-hearth.

Titanium hardens and strengthens aluminum and increases its toughness and resiliency. It is stated that the addition of titanium, chromium and copper to aluminum gives some of the hardest and toughest light alloys yet produced.

Richards states that titanium has been alloyed with aluminum in proportions up to 7 per cent, but that 2 per cent gave the best result. This alloy had an elasticity comparable to spring brass, but it corroded badly and so has disappeared from the industrial world. Copper is greatly improved by the addition of titanium in small amounts to remove oxygen and gases, and this is a branch of the industry which is now undergoing rapid development.

Rossi added 5 per cent of a pig iron containing 0.20 per cent titanium to a non-titaniferous pig iron, and increased the transverse strength thereof from 3,390 to 3,778 pounds per square inch. Then he added 25 per cent of the same pig iron, but the strength was increased only to 3,480 pounds. I am inclined to believe that he chilled his iron when using the larger amount of titaniferous pig, or else that he raised the freezing temperature without equally raising the casting temperature and thus destroyed in part the good effect of strength which the titanium treatment would have had. This matter of the casting temperature of cast iron is one which a great many investigators of titanium treatment seem to have overlooked; indeed, it is one upon which little scientific thought appears to have been expended, for I have found little published data upon it. However, Longmuir has studied the effect of casting temperature on tensile strength, and his figures will serve as a guide to show us the importance of this question; I have averaged the record of about 42 tests published by him in 1903 and 1904, with the following result: The strength of iron cast at the correct temperature (estimated by Longmuir as about 1,230 degrees Cent. = 2,246 degrees Fahr.) averaged 23,985 pounds per square inch; that if iron cast too hot (estimated by him as about 1,320 degrees Cent. = 2,408 degrees Fahr.) was 16,100 pounds, equivalent to a loss of 33 per cent; that if iron cast too cold (estimated as about 1,120 degrees Cent. = 2,048 degrees Fahr.) was 17,781, or a loss of about 26 per cent. Therefore, if we are aiming to improve strength, we must guard against casting the iron either too hot or too cold, and this matter is equally important whether we operate by means of titanium or in any other way.

Rossi's experiments, which are quoted above, seem to have been made in crucibles and in the iron casting ladle. He supplemented them by others in which he used 4 per cent of a ferro-titanium alloy containing 10 to 15 per cent of Ti. By this means he increased the transverse strength of cast iron by 20 to 25 per cent, and the tensile strength by 30 to 50 per cent.

Rossi reports another set of tests in 1905, in which he added 1 per cent of ferro-titanium alloy containing 12 per cent titanium to cast iron and increased the transverse strength from 17 to 23 per cent, and the tensile strength from 6 to 29½ per cent.

In the same year, Goldschmidt reports a series of tests in which he added 0.1 per cent of titanium to iron by means of thermit, and obtained increases in the transverse strength of from 1 to 17 per cent, and in the tensile strength of from 4 to 16 per cent.

In 1908, Prof. Martin Hokanson, of the Carnegie Technical Schools, found the compressive strength of chilled cast iron which had been treated with ferro-titanium alloy to be 298,000 pounds per square inch, as compared with 173,000 for the same metal untreated. The hardness of the treated metal was 557 (Brinell), as compared with 445 for the untreated iron.

Dr. Richard Moldenke made a series of tests on white and gray cast irons in 1908, with the results given in Table I.

Average of treated gray cast iron, 3,070, equivalent to increase of 52 per cent; average of treated white cast irons, 2,430, equivalent to increase of 18 per cent.

Moldenke added ferro-titanium alloy

[1]Presented before the American Foundrymen's Association.

equivalent to 0.10 per cent of titanium, to the bed of a cupola, but the result of tests of the metal therefrom was so irregular that he judged an average to be unrepresentative. I have duplicated this result several times, and am inclined to believe that the oxidizing influences brought to bear on the bed of a cupola make the use of titanium there of uncertain value as far as strength is concerned. The whole question of the use of titanium in the cupola requires investigation. The ferro-titanium alloy melts at a higher temperature than the iron itself, and therefore gets nearer the tuyeres before it begins to trickle down into the hearth. If, during this transit, it meets with slag, its value will be lost as far as the iron is concerned, because it will attack the oxygen in the slag and unite with it, thus being used up. Cupolas must be constantly drained clear of slag when titanium alloy is melted with cast iron therein. We must go even further than this precaution to prevent a layer of slag accumulating on top of the metal and intercepting the drops of melted alloy, because constantly draining the cupola will not keep the slag away, provided the level of the iron bath rises and falls several inches at intervals; as, for example, when the iron is collected inside the cupola instead of in the ladle.

Three minutes should be allowed the titanium to act upon cast iron before it is teemed, and more if the alloy is not then absorbed, as indicated by the pasty state of what remains. If the iron has not heat enough to permit this three-minute wait then it should have been produced in hotter condition in the first instance, but, in any event, if it cannot be held three minutes and still poured at the correct teeming temperature, one must not blame the lack of success on the treatment, but on the manner in which the treatment is performed. I have failed in test after test because the metal had to be carried some distance from the cupola before it could be treated, or because it was about the correct pouring temperature before the three-minute wait, and, therefore, too cold thereafter. If this paper proves that the titanium treatment is advantageous to cast iron, then it must also prove that it is advantageous to perform the treatment properly.

When titanium unites with the oxygen or nitrogen in iron or steel, there is unquestionably an evolution of heat which opposes the cooling of the bath during the wait. Fitzgerald showed that a bath of cast iron increased 25 degrees Fahr. during its treatment with 1 per cent of titanium in the form of ferro-titanium, but that this lasted only one minute and then the temperature slowly fell again.

C. H. Gale, one of the most experienced American malleable cast iron manufacturers, reported in 1911 the results of many tests made on the treatment of malleable cast iron with ferro-titanium alloy. In his first test, Gale added, first 1.25 per cent, and then 2.50 per cent of the alloy in the ladle, with the consequence that the iron was teemed much too cold, and also it proved to be mottled instead of having the usual, and desired, white fracture. Both of these conditions would, of course, decrease the strength of the metal; nevertheless, the treated bars in one set averaged slightly stronger than those untreated, and, in another set, were about 19 per cent weaker in tensile test. The transverse tests of the treated metal proved it to be from 5 to 30 per cent stronger than the untreated metal. Nevertheless, the result indicated that such a ladle treatment of malleable cast iron did not promise much success unless the silicon were reduced so as to prevent mottled iron being produced, since titanium causes a precipitation of graphite, and unless the metal were increased in temperature so as to wait during the time of treatment and still be at a good heat for pouring.

Gale then made a series of tests adding the alloy in the furnace about 30 to 45 minutes before tapping, but it scarcely seems likely that this would have as marked a result as if the alloy had been put in the furnace as soon before tapping as practicable, because titanium oxidizes so quickly that its effect would be lost in a comparatively short time. However, the transverse shows an improvement on the average of 15 per cent in the bars treated with 0.30 per cent of the alloy, and 17 per cent in the bars treated with 0.60 per cent.

Thomas D. West, by adding 12 ounces of the usual ferro-titanium alloy to a ladle of cast iron containing 225 pounds, obtained an increase of 27 per cent in the transverse strength, as an average of five tests; by adding 22 ounces of ferro-titanium alloy to 225 pounds of iron, he obtained an increase in transverse strength of 32 per cent, as an average of five tests.

The results of these experiments signify: That iron may be increased in strength as much as 43 per cent by the correct use of titanium; but, to accomplish the best results, the titanium must not only be in correct proportions, but the iron must be given a fair chance by allowing the titanium a full opportunity to become thoroughly dissolved in it (not less than three minutes' treatment), so that it is neither wasted in the slag nor left unmelted in the ladle, and by insuring that the iron is poured neither too hot nor too cold.

In Table II are summarized the results obtained by different investigators.

Table I.

TRANSVERSE TESTS OF WHITE AND GRAY CAST IRONS, POUNDS PER SQUARE INCH

Gray irons.		White irons.	
Untreated iron (average of 9 tests)	2,020	(Average of 8 tests)	2,050
Plus 0.05 per cent Ti (average of 4 tests)	3,100	(Average of 11 tests)	2,400
Plus 0.10 per cent Ti (average of 3 tests)	3,030		
Plus 0.05 per cent Ti (average of 6 tests)	3,070	(Average of 9 tests)	2,420
Plus 0.10 per cent Ti (average of 6 tests)	2 960	(Average of 10 tests)	2,400
Plus 0.15 per cent Ti (average of 4 tests)	3,190	(Average of 10 tests)	2 520

Table II.

Investigator.	Used. Ferro-titanium.	Increased. Tensile strength, per cent.	Transverse strength, per cent.
Rossi	Alloy	30 to 50	20 to 25
Schiemann	Thermit	30 to 50	
Rossi	Alloy	6 to 30	17 to 23
Goldschmidt	Thermit	4 to 16	1 to 17
Moldenke	Alloy	.....	18 (white)
Moldenke	Alloy	.....	52 (gray)
Guillier	———	.....	49 (mall. iron)
Guillier	———	.....	14 to 30 (gray)
Feise	Alloy	.....	35
Treuheit	Thermit and alloy	No important change	
Gale	Alloy	.....	10 to 20
Alexander	Alloy	Increased	Ductility
Geiger	Alloy	12 to 26	6 to 10
West	Alloy	.....	27 to 32
Stoughton	Alloy	.....	10 to 43

MINING NEWS FROM THE IRON RANGES

New Mesabi Range Properties

What is asserted to be one of the richest deposits yet discovered on the Mesabi range lies in a "forty" adjoining M. A. Hanna & Co.'s Sliver mine in the Virginia district. The ore was found by Harry Osterberg and associates, of Virginia, who hold the tract on a lease based on a royalty of 35 cents a ton, and will be developed by M. E. Richards, of the same city, and associates, who have acquired the right to mine at a reported advance in royalty of $1 a ton. The deposit is estimated to contain 1,000,000 tons and it is claimed the assays have showed 65 per cent in metallic iron. The property had been explored previously, but without results, doubtless because the earlier prospectors did not penetrate to sufficient depth. The mine will be an underground producer. Shaft sinking will be started shortly, with a probability that the initial shipments will be made late the coming season.

Another prospective Mesabi producer this year is the Roberts property, near Nashwauk, which Butler Bros. will both strip and operate under contract. About a million tons of ore have already been proved up. The overburden is comparatively shallow, averaging less than 25 feet. Butler Bros. are stripping the La Rue mine, at Nashwauk, and have about a year's work there yet to do. The new operation will be carried on simultaneously. Machinery has lately been installed at the Eaton property, near Buhl, and preparations are being made to start shipments with the opening of navigation. The Eaton is a small underground mine, held under lease by the Robertson-Hoar Iron Mining Co., of Virginia. Shipments of Mesabi ore are being made to the Zenith Furnace Co., at West Duluth, this winter from the Utica mine of Pickands, Mather & Co. and the Morton property of the Tod-Stambaugh Co. The fee of the Morton is owned by the state of Minnesota.

Among the new shippers on the Cuyuna range this year will be the Barrows mine of M. A. Hanna & Co. It is the reported intention to increase the working force to the extent of 100 men, with the installation of a big, new pump completed. The mine already has two shafts and a third one will be put down this year. A stockpile of good size has been accumulated. The Barrows is being provided with an excellent equipment, including a plant which furnishes electricity for both illuminating and power purposes.

Shaft at Copps Mine

The Presque Isle Iron Co., controlled by R. J. Whitesides and W. G. La Rue, of Duluth, is making satisfactory progress with the development of its Copps property, five miles north of Marenisco, Gogebic range. This prospective mine is in section 21, township 47, range 43, adjacent to the Presque Isle river. The shaft, 6 x 24 feet in dimensions, is down in excess of 100 feet and will, it is expected, be sunk at the rate of 40 feet a month. It is going down in a diorite of the hardest kind. No water is expected to be encountered before a depth of several hundred feet. Washington fir exclusively is being used for timbering. There is much interest in the work at the Copps, for the reason that it is the pioneer venture in what may prove to be a district as rich as any in the Gogebic country. The shaft-sinking is the sequel to diamond drill exploration several years ago which resulted in the discovery of ore of excellent grade. It is understood that ore was encountered at less than 300 feet from surface and that deeper borings, particularly those at depths from 800 to 1,200 feet, indicated the existence of a large deposit. In any event, a big sum of money is now being expended in development.

Provided the Minnesota legislature grants the necessary authority, the Steel Corporation will establish a mounted police service on the Mesabi range, supplementary to its existing force. The new service is designed particularly for duty in isolated localities.

The sensational damage suit filed by the fee owners of the Norman mine, at Virginia, Mesabi range, against the Oliver Iron Mining Co., operator of the property, has been settled out of court. The terms are not announced.

Progress on Menominee Range

A new shipper in the Iron River district of the Menominee range this year will be the Jones & Laughlin Steel Co.'s Forbes mine. Shaft-sinking was started in December, 1911, and in less than a year ore was being put in stock. The property is being provided with one of the best equipments in the region. A double-drum hoist transferred from the Mesabi range is being installed at the Rogers-Brown Ore Co.'s Chicagon mine, east of Iron river and tributary to it. The Chicagon entered the shipping list only two seasons ago. It was first explored 30 years ago, since which time it had been in the hands of various interests. At its big Rogers mine, the Rogers-Brown company has lately installed a new air compressor and a more powerful hoisting plant. The property entered the producing list a few weeks ago, after many months of preparatory work. Pickands, Mather & Co. are erecting a miners' change house at their new Bengal property. The building is 34 x 102 feet and of brick construction. Corrigan, McKinney & Co. have started the work of sinking a second shaft at the Tully mine, recently restored to the active list. The Wickwire Steel Co. has broken ground for a drop shaft 12 x 14 feet at its Homer property, formerly known as the Donohue and McGovern. The New York State Steel Co. is building additional dwelling houses at its Davidson mine.

New Activity at Grand Rapids

People residing in Grand Rapids, Minn., and other towns on the extreme western end of the Mesabi range are hoping that actual mining operations will be under way in their district in the next few months.

Various leases held by the Oliver Iron Mining Co. for the last six or seven years on lands between Pokegama dam and Pokegama lake, which were surrendered by the company some months ago, have been taken over by the Jones & Laughlin Steel Co. The new leases will provide for a period of six months, during which Jones & Laughlin may verify the drillings of the Oliver company and an option of a further extension of six months.

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Tributes to John Fritz by Men Who Knew Him Best

A spirit of unselfish helpfulness, especially to young men, was one of the strongest characteristics of John Fritz, whose long and useful life came to a close last Thursday morning. A distinguished engineer, writing to THE IRON TRADE REVIEW, relates the following incident:

My first meeting with John Fritz was in December, 1875. I was then a student in Stevens Institute of Technology, and was preparing to write a thesis on "A Project for a Blast Furnace". I went to Bethlehem with a letter of introduction to Mr. Fritz, reaching the Sun hotel, where he was then living, at night. The clerk told me that Mr. Fritz had retired and that I would have to get up pretty early in the morning if I wished to meet him at breakfast, for he always breakfasted at 5 o'clock. I met him at that hour, and he invited me to call at his office after I had made a trip through the works. I did so, and then he introduced me to his head draftsman and told him to let me make tracings of any drawings of blast furnaces that I wished to make and to answer any questions about them that I might ask. This action was characteristic of the man. He was always ready to help young engineers, and his geniality towards them was, no doubt, one of the chief causes of his having so many devoted friends throughout his life.

This attitude of Mr. Fritz in giving of himself and his work to help others was always maintained. Those who knew him best can now speak most appreciatively of his character and show to coming generations most impressively why he should be emulated. THE IRON TRADE REVIEW has, therefore, requested a few men prominent in the iron world, nearly all of whom were intimate friends for years of John Fritz, to write briefly their estimates of him as a man and as an engineer. The responses which follow form a remarkable series of tributes:

By Robt. W. Hunt

The fundamental quality of John Fritz's character was honesty—plain, straightforward, unswerving honesty, shown not only in his personal life, but also in his engineering work. Whether of buildings or machinery, his designs were so marked by simplicity, strength and evident adpatability to their purpose that they proclaimed their originator, and that simple, truthful, but always forcible character made for him his unique and commanding position in the iron and steel world.

A distinguished lawyer and capitalist, while secretary of navy, said of him, "John Fritz is the most honest man I have ever known." As a manufacturer, he insisted upon all products of his works being of the very best possible quality, and when commercial conditions prevented their profitable production, instead of lessening their cost through inferior quality, he substituted that which would justify honest work. Thus he turned the Bethlehem Works from Bessemer steel rails to open-hearth armor and ordnance steel, and in so doing gave to America a new industry.

By S. T. Wellman

That grand old man, who was lovingly called by all who knew him "Uncle John Fritz", has gone to his long rest, and we shall never see his equal again on earth. He surely was one of nature's noblemen, the most tender-hearted, honest and in every way noble, great man it has ever been my privilege to know. He was born a poor boy, was a natural mechanic and engineer, full of energy and ambition. By sheer ability and hard work, he obtained a practical education and worked himself up into the foremost rank of the great iron and steel engineers of the world.

A favorite maxim with him was that anything that was worth doing at all was worth doing well. Every one who knew John Fritz knew that everything he did was done well.

His life was a living example to all young Americans, that a college education or money is not necessary to place a man in the front rank of the world, but that a boy, no matter of how lowly origin, who has a talent in any particular line, can, if he is ambitious and not afraid of hard work, reach almost any position he may seek. The great works at Cambria and Bethlehem will always stand as monuments to Mr. Fritz's ability, not only in planning and building well, but also in selecting and training good men to operate. All who knew him mourn sincerely the loss of a good and noble friend.

By Chas. S. Price

By the death of John Fritz, there has passed away not only the man who had accomplished more than any other in pioneer engineering improvement in America, but a man whose character, due to his in-

tegrity, honesty of principles and fair dealing with and loyalty to those associated with him, stands out conspicuously in these days of keen business competition and strife for the last dollar of industrial return which has made the much abused term *efficiency* an excuse for sinking all ordinary human consideration of others. The number is legion who have in various ways during his long and active life come under his influence and profited by his guidance and who will keenly feel the loss of the kindly spirit and wise counsel that meant so much in aiding them to pass over the rough places on the way to success. The steel industry has lost its greatest engineer. He was big in every sense—in character, broad humanity, engineering ability and right dealing with all with whom he was in any way associated. In consequence, few have ever left the wide gap in the manly affections of his former associates and friends that John Fritz has in passing away.

By William Kent

Twenty-one years ago, a small party of engineers met in the Engineers' Club in New York, and agreed that it would be a good thing to give John Fritz a dinner in his home town, Bethlehem, Pa., on the occasion of his seventieth birthday. It was proposed to have the dinner in a hotel. Circulars were sent out asking for subscriptions to the dinner. Replies came in in such numbers that the hotel dining room was too small to accommodate the crowd, and a large hall was selected, which also soon proved too small. The armory in South Bethlehem was then engaged, and four hundred guests from all parts of the country sat down to the dinner. Ten years later, his eightieth birthday was celebrated by a dinner at the Waldorf-Astoria hotel in New York, which was attended by about six hundred guests. Of all the numerous famous dinners of the American Institute of Mining Engineers, these two were the greatest, not merely in numbers, but in everything that makes such a gathering memorable—good speeches, good will, enthusiasm, fun, and above all in the sincere desire of every guest to do honor to one of America's greatest engineers, and the best loved, since Alexander L. Holley died in 1882. The life, the achievements, and above all the nobility and the gentleness of the man were and are an inspiration to every one who knew him, and the story of his life as written in his "Reminiscences", recently published, should be an inspiration to generations of engineers to come.

By Joseph G. Butler Jr.

John Fritz has been a household word with the iron people for more than half a century. About the time he became superintendent and engineer of the Cambria Iron Works at Johnstown, Pa., in 1854, I started out on my own career in the same business, at the old Ward Iron Works, at Niles, Ohio, and have kept pretty close track of Mr. Fritz ever since. His life was full of activities. His rugged honesty and intensity of purpose stood out prominently at all times. His connections with iron industries and his inventions during a long and useful life are recorded in history. The value of his investigations and contributions to the development of the Bessemer steel process can scarcely be estimated. It was my good fortune to know him personally, and I have attended several gatherings given in his honor. His name will long be revered in the annals of the iron and steel industry of the world.

By E. H. Gary

John Fritz was a splendid type of citizen. His personal efforts and his improvements relating to the steel industry have had a marked and beneficial effect. He had the respect and confidence and affection of all who knew him. He was easily the Nestor of the steel fraternity. His death will be deplored by an innumerable host of men. Therefore, if I had the time I should like to write to you more of my good opinion and personal friendship for him and my grief because of his death.

By Julian Kennedy

The history of his life is that of the development of the iron and steel industry in America. He was a great engineer and a man without fear and without reproach. Through a long, busy and useful life, he always remained young in spirit.

His works do follow him and his memory will long be cherished by his legion of friends.

His example will always be an inspiration to the young men of the world.

By John E. Sweet

History is made up of the recorded deeds of a nation's greatest men. In the olden time, a country's great men were its generals and statesmen. A country grew by war and treaties of peace after the war, and no record was kept of the achievements of peaceful pursuits.

When the history of our time is written and written rightly, the name of John Fritz will stand out in letters of gold. The last half of the eighteenth century was the age of iron and steel, and who but John Fritz was the Lieutenant General of that period? He was the Iron Duke.

By Ambrose Swasey

In the passing from earth of John Fritz, there comes to us, with greater forcefulness than ever before, the true significance of his long and exceptional life.

His achievements in the engineering profession will stand as a monument to his ability; and the uplifting influence and inspiration of his own noble character will continue for generations to come.

He was not only one of the great constructive men of his age from the standpoint of those practical developments which have formed so important a part in the progress of our civilization; but he also reared a structure on the higher and broader plane of humanity, in the host of friends and admirers who gathered about him because of the endearing qualities he possessed.

What he did was marvelous, but what he was, was even greater and more enduring.

By Willis L. King

The broad mindedness and great heart of John Fritz impressed me deeply. In his day and generation, he was undoubtedly one of the great manufacturers of steel, to say nothing of his inventive genius, which hastened very greatly the day of increased output. He died full of years and honor, although there are few of his contemporaries living to mourn his loss.

MEN OF THE IRON TRADE

W. P. Snyder, president of the W. P. Snyder & Co., Pittsburgh, is enjoying a vacation in Florida.

James H. Barr, president of the National Supply Co., Pittsburgh, has returned from a trip to Mexico.

D. W. Lamb has resigned as manager of the Fergus Iron Works Co., Fergus Falls, Minn., and O. A. Fetvedt succeeds him.

W. A. Riddell severed his connection with the Otis Steel Co., Cleveland, on Feb. 15, being no longer associated with that company in any capacity.

Thomas A. Edison, the inventor, celebrated his sixty-sixth anniversary, Feb. 12. He spent the day quietly at his home and laboratory at West Orange, N. J.

W. H. Eastwood, president of the Electric Controller & Supply Co., Cleveland, visited with friends in Ensley, Ala., Tuesday, while en route to his home from a vacation in Florida.

H. E. Woodward was elected president of the Excelsior Brass Works, Reading, Pa., at the recent annual meeting. A. L. Frame was chosen vice president; H. Etheridge, treasurer, and L. M. Gantert, secretary.

F. H. Daniels, Worcester, Mass., chief engineer of the American Steel & Wire Co., sailed Feb. 15 for a Mediterranean cruise. Mr. Daniels has not been in good health of late, but his condition is now much improved.

William H. Dunham, Cleveland sales manager for Joseph T. Ryerson & Son, Chicago, has returned to his desk after a three weeks' absence. Mr. Dunham has been in Panama, where he has inspected the canal.

James F. Thompson, division superintendent of the Colorado Fuel & Iron Co., Trinidad, Colo., has resigned to take a position with the Albuquerque-Cerillos Coal Mining Co., with headquarters at Albuquerque, N. M.

Charles W. Hubbard Jr., for 16 years president of the American Axe & Tool Co., Pittsburgh, has resigned. J. R. Kelly, who has been identified with the company for a number of years, has been elected Mr. Hubbard's successor.

M. R. Schwer has resigned his position as assistant superintendent of the open-hearth department of the Colorado Fuel & Iron Co., Pueblo, Colo., and has accepted the position of manager of the Pueblo Foundry & Machine Co., that city.

William Garstang, superintendent of motive power of the Big Four railroad, has been promoted to master car builder of that system. S. K. Dickerson, formerly with the Lake Shore railroad, has been appointed to succeed Mr. Garstang.

J. E. Dailey, chief civil engineer of the Brier Hill Steel Co., Youngstown, O., has been promoted to the position of assistant to Barton R. Shover, the general superintendent. Mr. Dailey was formerly connected with the Ohio works of the Carnegie Steel Co.

Charles L. Allen, treasurer and general manager, and Aldus C. Higgins, secretary of the Norton Co., Worcester, Mass., have gone to Europe for a month's business trip. They will visit the company's plant in Germany and some of its most important continental agencies.

H. D. Wilson, formerly vice president of the Wilson-Snyder Mfg. Co., Pittsburgh, is now vice president and general manager of that company. Benjamin F. Harris, now secretary of the Dravo-Doyle Co., Pittsburgh, will become sales manager of the Wilson-Snyder Mfg. Co., March 1.

Roy M. Lechthaler, former representative of the Pennsylvania Steel Co., at Pittsburgh, is now associated with the Central Iron & Steel Co., at Harrisburg, Pa. He has been succeeded at Pittsburgh by E. E. Goodwillie, former representative of the Pennsylvania Steel Co. at Harrisburg.

E. J. Buffington has been re-elected president of the Indiana Steel Co., the Gary Land Co., and the Gary Light, Heat & Water Co., all of Gary, Ind. Other officers re-elected include G. G. Thorpe and E. W. Robinson, vice presidents; T. J. Hyman, secretary-treasurer; K. K. Knapp, general counsel.

George L. Pullen was elected president of the Frost Engine Co., Evansville, Wis., at the recent annual meeting of the stockholders. C. J. Pearsall was chosen vice president and Frank Frost secretary, treasurer and manager. T. C. Richardson was re-elected a director and H. A. Langemack was elected to the board of directors to take the place of W. B. Meggott, deceased.

Mortimer R. McCausland has been elected president of the Norwalk Lock Co., Norwalk, Conn., and G. R. Barnum, secretary-treasurer. The board of directors elected includes Eben Hill, W. F. Bishop, H. B. Plumb, R. J. Plumb, E. J. Hill, Edward Beard, Mortimer R. McCausland, Thomas I. Raymond and Christian Schwartz.

A. W. Carey, manager of the Tennessee Coal & Iron Co., has been elected president of the Transportation Traffic Club, at Birmingham, Ala. Other officers are: Vive president, E. T. Wilcox; second vice president, W. P. Redd; secretary, H. H. Knight; treasurer, E. D. Melver. The board of governors includes L. Sevier, T. H. Benners, E. F. Stovall, J. T. Stokely, W. W. Wood.

Gen. Otto H. Falk, vice president of The Falk Co., and receiver of the Allis-Chalmers Co., Milwaukee, declined election to a fourth term as president of the Merchants and Manufacturers Association of Milwaukee, but accepted election as a director for three years. A. T. Van Scoy, assistant secretary of the International Harvester Co., was also elected to the directorate for the three-year term.

C. H. Harlan, for the last two-and-a-half years structural engineer for the McClintic - Marshall Construction Co., Pittsburgh, has been promoted to the position of contracting engineer for that company. He succeeds R. B. Titsworth, who has accepted an official position with the Detroit Bridge & Steel Works, Detroit. Mr. Harlan is a graduate of the University of Pittsburgh, and is one of the best known young engineers in the Pittsburgh district.

Otis H. Cutler is chairman of the board of directors of the Southern Wheel Co., the new concern which was organized recently to take over the properties of the St. Louis Car Wheel Co., St. Louis, Mo., the Decatur Car Wheel & Mfg. Co., Birmingham, Ala., and the Atlanta Car Wheel & Mfg. Co., Atlanta, Ga. S. F. Pryon, St. Louis, was elected president; J. D. Gallagher, New York, vice president, and J. J. Morse, St. Louis, secretary and treasurer.

CONTINENTAL IRON AND STEEL MARKETS

GERMAN IRON TRADE

Berlin, Jan. 30.—The shortage of railway trucks in Germany now appears to have adjusted itself so far as Rhineland and Westphalia are concerned, but affairs appear to have been much more serious than was supposed. Practically all industries in these districts were affected and many suffered serious injury. Blast furnaces were put on reduced burden or damped down; one steel works is reported to have been shut down altogether for a time; and in one of the newest steel-making plants in the Ruhr district, which had an overflowing order book, and which, being designed for a big output, is furnished with mechanical equipment of an expensive kind, involving heavy working expenses and, therefore, continuous working at full load to cover them, a good proportion of the furnace plant was stopped for a time, the reason being that owing to shortage of trucks dolomite could not be obtained in sufficient quantity.

To improve conditions, a start has been made with the ordering, for delivery during the next six months, of 19,435 wagons for the Prussian state railways; and it is expected that another similar lot will be ordered for delivery during the latter half of the year.

Notwithstanding the frequent disappointments in the political world, the German metallurgical market continues to manifest considerable confidence in the future. In consequence of the shortage in pig iron, and the strong foreign demand, export prices have been for some time rather higher than home prices. On the other hand, the importance of the home consumption is such that the Steel Works Syndicate has had to reduce its export business. It has even had to buy English pig iron to be able to fill some of its foreign orders. Considerable quantities of pig iron are already sold for export during the second half of the year. The market in bars is not less active, and all factories have sold their production for the first half of 1913. Some producers who generally have about 10,000 tons in stock at this period of the year, have barely 2,000 tons now. Export business continues on a large scale, and prices are now called 122 marks ($28.67) per ton, f. o. b. Antwerp. A meeting of the producers of bar iron will be held on Feb. 26, to consider a new scheme of co-operation, in order to facilitate the export business during perilous times.

FRENCH IRON TRADE

Paris, Jan. 30.—The French metallurgical situation is one of continued great activity, and the tendency of the market is clearly toward higher prices. For some time there has been observed a slight decrease in the volume of business contracted for; but this has caused no disquietude among the producers, for they have been able to use the "de tente" in order to reduce the delays that were incurred in delivering the goods that were already on order. Turkey has just given an order to the Creusot factories and the Marine et d'Homecourt works for an important quantity of mountain artillery, which, added to the other orders in hand, makes sufficient business for these houses for a long time.

It is said that another German factory is about to be established in the basin of Briey. The Gutehoffnungshutte, of Westphalia, has bought a large piece of land at Thionville, or in its immediate neighborhood. The purpose of the company named is to construct 14 blast furnaces, but for a beginning the number to be constructed will be four to six.

RUSSIAN IRON TRADE

St. Petersburg, Jan. 30.—The tone of the Russian iron market continues very firm, with a strong demand for pig iron, which the furnaces at full work appear quite unable to overtake. The features particularizing the state of the market may be described as follows: Iron and pig iron very firm, moderate demand for form iron, good demand for girders, particularly strong for rails and wire. The prices quoted are: Form iron, 1 rouble 44 to 53 copecks (73 to 77½ cents) per pood; girder iron, 1 rouble 46 to 54 copecks (74 to 78 cents) per pood; tank iron, 1 rouble 60 to 65 copecks (81 to 83½ cents) per pood; roofing iron, 2 roubles 10 to 20 copecks ($1.07 to $1.12) per pood; cast pig iron, 70 to 72 copecks (35 to 36 cents) per pood (ex-works). The demand for rails which is so strong is due to the extraordinary activity in railway circles, where both government and private interests are being sedulously encouraged. Government lines are being pushed on in many directions, and private projects are almost too numerous to mention; with a fair proportion of them fully authorized to proceed to construction. Many, of course, are simply speculative ideas that cease to exist on contact with government examination.

BELGIAN IRON TRADE

Brussels, Jan. 30.—Generally, the situation may be considered as similar to the preceding week, as the signs of peace, now rudely shattered, have not had time to affect the market in a positive sense, but it remains very firm with an active demand. It is computed that during the last three months of 1912 the number of transactions had rather declined. Raw material is still offered at high prices and rail rollers have little difficulty in closing orders at the current quotations, say for 1,000 tons and more. Somewhat fancy prices are obtained for smaller parcels. The steel works have been doing good business for Egypt, Spain and Denmark in heavy rails, and grooved rails have been sold for various countries. Much large business is being discussed and will probably be brought to a head when peace is assured.

Coming to details, pig iron continues active and firm at late prices. Hal products are 2s (49 cents) per ton dearer for export, sheet bars now being quoted £5 9s ($26.53) to £5 11s ($27.02) per ton, and billets £5 5s ($25.55) to £5 9s ($26.53) per ton, f. o. b. Antwerp. Prices for home consumption are unchanged. The market for bars has of late been much quieter, and several makers have been induced to reduce the prices for iron bars by 3s (73 cents) to £6 3s ($29.94) to £6 4s ($30.18) per ton; steel bars are quoted 2s (49 cents) lower at £6 ($29.21) to £6 2s ($29.70) and hoop iron can also be bought 2s (49 cents) cheaper at £7 4s ($35.06) to £7 6s ($35.55) per ton, f. o. b. Antwerp. On the other hand, the rail market has continued active; in fact the unfilled orders on hand by the Steel Syndicate are reported to amount to record quantities.

John Fritz Passes Away in His Ninety-First Year

Long Life of the Great Engineer Closes--Simple Funeral Services Attended by Representatives of the Iron Trade and Engineering Societies

John Fritz, the long distinguished and greatly beloved engineer, died at his home, South Bethlehem, Pa., at 1:45 o'clock Thursday morning, Feb. 13, in his ninety-first year. The death was caused by general debility and kidney trouble. For nearly a year, Mr. Fritz had been ill, but at times had improved to such an extent that he hoped again to meet his friends.

The last occasion on which the name of John Fritz was used in connection with the meeting of an engineering society was at the gathering of the American Society of Mechanical Engineers, held in New York, Dec. 3 to 6, 1912. At that time, the John Fritz medal was awarded to Capt. Robert W. Hunt, a life-long friend of the man in whose honor the medal was named. Mr. Fritz had always been a regular attendant at the meetings of the mechanical engineers, but failing health forced him to send a message of regrets. The message is as follows:

"I wish to convey to you through my friend, Dr. Drinker, my very hearty greetings and to express my great pleasure and satisfaction over the award by your committee of the medal bearing my name to my beloved old friend, Capt. Robert W. Hunt. No worthier selection could have been made. He is a man so distinguished, so able, so deservedly prominent in the engineering profession, that there can be no question about the wisdom of your choice. I only wish I could be with you tonight, but my physical condition is not as yet such as to permit it. I can, however, thank God for the improvement in my strength and health since my operation last spring, and I hope that I still may have the pleasure of meeting you all on some future occasion."

The autobiography of John Fritz appeared last year and affords a keener insight into his life-work and personal characteristics than any other account ever published. The chapters pertaining to his work at Cambria are highly interesting and emphasize the absorbing devotion with which he set himself to work in advancing the processes of steel making. An excerpt from the autobiography shows the methods he followed in accomplishing this purpose: "I laid down an absolute rule to not even suggest anything new or untried until I had satisfied myself that it was all right and was the proper thing to do, and consequently I was well fortified and was in a position that was at all times impregnable."

Funeral Services

The funeral took place Monday afternoon at Bethlehem, Pa., and was, like the life of the departed ironmaster, impressive, but simple and unostentatious in character. Through the morning and the early afternoon, the friends of Mr. Fritz in his lifetime called at the residence in groups to pay their last respects to all that remained mortal of him. There, in the dimly lighted parlor, the remains reposed while surrounding the coffin were banks of flowers and clusters of floral pieces, tributes, most of them, from those with whom he had been associated in the industry toward whose progress he contributed so conspicuously.

The funeral services at the residence were commenced while the large clock in the hall was striking three, the Rev. D. Mast Gordon officiating. Rev. Gordon, now of Glenside, Pa., was formerly pastor of the Fritz Memorial Methodist Episcopal church, which Mr. Fritz established a number of years ago, in memory of his parents. Following the prayers and a brief sermon by the pastor, a quartet sang "Rock of Ages".

The pall-bearers who carried the late Mr. Fritz to his final resting place were all men who formerly worked under him when he was general superintendent of the Bethlehem Steel Co.'s works. They were: James Watters, John Olp, John Leibert, William Shennon, Martin Hackman, Robert Cortwright, L. J. Miksch, Owen Leibert, J. Frank Johnston, Harry E. Morris, William J. Trythal and Wilson Roth.

The honorary pall-bearers included Charles M. Schwab, Archibald Johnston, H. S. Snyder, E. G. Grace, Barry H. Jones, C. A. Buck and W. F. Roberts, representing the Bethlehem Steel Corporation. The engineering societies were represented by C. Warren Hunt, secretary of the American Society of Civil Engineers; Joseph Struthers, secretary of the American Institute of Mining Engineers; Calvin W. Rice, secretary of the American Society of Mechanical Engineers; F. L. Hutchinson, secretary of the American Institute of Electrical Engineers. The board of trustees of Lehigh University was represented by Dr. Henry R. Rice, the Right Rev. Ethelbert Talbot, Rembrandt R. Peale, Warren A. Wilbur, Charles L. Taylor, Albert N. Cleaver, Charles M. Schwab, David J. Pearsall and Samuel D. Warriner. Mr. Fritz, as is well known, was a member of the first board of trustees which directed the affairs of Lehigh University. Dr. Henry S. Drinker, Prof. J. F. Klein and Prof. F. P. McKibbem represented the faculty of the university. The honorary pall-bearers also included a large number of men who were selected, not as representing any official body, but because they were Mr. Fritz's closest friends during his lifetime. They included Abram S. Schropp, Richard V. Leibert, Dr. Abram Stout, F. E. Luckenbach, M. A Borhek, Charles M. Dodson, Capt. Frank Stout, Dr. John A. Wilson, Dr. W. L. Estes, R. Morris Gummere, Josiah Bachman, H. Sheldon Kitchel, Capt. H. L. Jewett and Gen. W. E. Doster, all of whom are over 70 years of age, and Albert Brodhead, G. R. Bradford,

In Advance of Other Engineers

By Powell Stackhouse

My recollections of John Fritz date back to the winter of 1856, *in Johnstown, Pa. He was then superintendent of the Cambria Iron Works, and was struggling with the engineering troubles inherited from his predecessors. While yet young in the iron business, he was quite in advance of other engineers, a position maintained through his business life. He led his employers and had difficulty to get them to support his advanced, but always well considered views. His relations with his fellow employes of all ranks were cordial, friendly and firm; his advice was sought and freely given to all. He lived a correct life, and his death will be mourned by all who were so fortunate as to know him.*

Joseph W. Adams, William B. Myers, W. H. Leibert, R. W. Hunt, W. H. Jaques, Ellis C. Kent and the Hon. H. W. Scott.

Interment was made in the Fritz plot in Nisky Hill cemetery, the Moravian burial ground in Bethlehem, from which can be seen, stretching out in panorama, the major portion of the steel works where Mr. Fritz concentrated his energies for so many years. On the road to the cemetery, about three blocks distant from the Fritz residence, was the student body of Lehigh University, stretched out in two long files, who stood bareheaded while the cortege wound slowly past them.

Engineers Present

The services at the Nisky Hill cemetery were conducted at the request of the Fritz family, by the Rev. A. D. Traeler, pastor of the Moravian church of Bethlehem. This sect was originally founded in Bohemia and Bethlehem has been its stronghold in this country since the town was founded. Its funeral service differs from that of any other religious denomination. A unique feature is the trombone orchestra, whose members, on the death of a member of the sect, ascend the tower of the church and play a dirge. From the melody which is played, the members of the faith in the town can tell whether it is a child or a married or single man or woman who has just departed on the long journey. As Mr. Fritz was not a communicant of the Moravian church the dirge was played only at his interment.

There were present at the funeral exercises a large number of eminent engineers from all over the country. From New York and Philadelphia they came in special cars. The John Fritz Medal Board of Award was represented by Dr. Sauveur, Dr. F. R. Hutton and Charles Kirchhoff. Letters of regret were received from John R. Freeman, president of the board; C. W. Hunt, Gano Dunn and Henry R. Towne. George Westinghouse, past president of the American Society of Mechanical Engineers and a Fritz medallist, sent word that he was detained at home by illness. H. G. Stott, vice president of the society, also sent word that he was unable to attend. The Institute of Mining Engineers was represented by R. W. Raymond, secretary emeritus; Charles Kirchhoff, past president; and E. E. Olcott, past president. Alfred Noble, a Fritz medallist; Major G. W. McNulty and John S. Kennedy represented the Engineers' Club, of New York. The American Society of Mechanical Engineers had present Jesse M. Smith, past president; Dr. F. R. Hutton, past president, and Honorary Secretary Calvin W. Rice. D. W. McNaughton and J. J. Cone, of the Robert W. Hunt Co., were present, as were Frank Skinner, of the Engineering *Record*; Hartley E. Wolle, superintendent of the Cambria Steel Co.; Prof. J. W. Richards, of Lehigh University; S. T. Wellman, E. M. MacIlvaine, president of the Lehigh Coke Co.; E. C. Felton, president of the Pennsylvania Steel Co.; James Gayley and W. H. Jaques, who left the navy in order to associate himself with Mr. Fritz when the latter first proposed to make armor plate and ordnance. J. Chester Wilson represented the Engineers' Club of Philadelphia, while the city of Philadelphia was represented by Carlton E. Davies, chief of the bureau of water; John Meigs, assistant director of the department of wharves and docks, and Henry H. Quimby, engineer of bridges of the bureau of surveys. H. G. Smith and W. M. Montgomery, of New York, and many others were present at the obsequies.

Many telegrams and messages of condolence were received by the family of the late Mr. Fritz. "He was a grand old man", wired Judge Elbert H. Gary. "The benefits he conferred upon the steel industry are very great and are much appreciated. His influence upon the business was always good. Personally, I entertained for him feelings of the highest respect and admiration."

Ambrose Swasey wired: "Earth poorer but heaven richer and achievements will continue to be an inspiration through generations to come."

Other messages were received from Alexander C. Humphreys, W. F. M. Goss, William H. Ridgway, Ellis B. Ridgway, T. King McLanahan, James M. Swank, R. E. Fox, of the Solvay Process Co., Robert W. Hunt, George Westinghouse, Henry C. Treiler, Charles L. Taylor, R. W. Raymond, Edward H. Williams Jr., S. T. Wellman, A. J. Moxham, E. D. Leavitt, D. A. Tompkins, W. A. Wilbur. Mr. Swank said: "He will be sorely missed in the iron trade, both at home and abroad." Andrew Carnegie wired his condolences and said that he could not attend the funeral as he was leaving for the south. Messages of condolence were also received from L. H. Cornell, Philadelphia; H. W. Moore, Philadelphia; E. E. Olcott, New York; Frank S. Witherbee, New York, and others.

Mr. Fritz's loss is deeply felt by his fellow townsmen, who loved him for his quiet and unassuming ways and for his good works. All places of business in Bethlehem and South Bethlehem were closed from two o'clock to four o'clock. At the steel plant, all machinery was stopped for five minutes at three o'clock.

His Life

From a country school boy, plodding through rain and snow to the little log cabin schoolhouse, to the position of recognized father of the greatest business the world has ever known; from the determined lad who used Bennett's intricate manual of arithmetic because there was no merit in doing what everybody else could do, to the man who solved the most involved problems and led the iron and steel business to its present

A Superb Manager, a Great American

By James M. Swank

In considering the wonderful career of John Fritz, two facts impress themselves on my mind more than all others. He was, first of all, a wholly self-educated man. At school, when a boy, he learned nothing about chemistry, geology, physics, or engineering problems of any kind. But he was a born mechanic, and all the knowledge that was essential to his success as a mechanic and an engineer he obtained by hard work and patient study of the mechanical and other conditions which surrounded him. I do not think that the industrial history of any country furnishes an example of greater achievements by a wholly self-educated man than is afforded by the life of John Fritz.

The next fact of greatest importance in the life of Mr. Fritz is the exceptional executive ability that he displayed in all the difficult administrative positions which he so successfully filled during his long and active life. He was a superb manager of men. He had the complete confidence of his business associates and the steadfast devotion of thousands of those who worked for him. He knew all of them by name in the early part of his career. At Bethlehem, in later years, he could not do this. At Johnstown, he knew every one. All the men who ever worked for him were proud to be known as John Fritz's boys, and he was always affectionately referred to by them as "Uncle John".

Peace to the ashes of a great American.

proud standing; from an apprentice in a machine shop to an engineer with a world-wide recognition as one who had revolutionized a mighty industry is in brief the life story of John Fritz.

As a pioneer, he installed the three-high blooming mills with automatic tables, the three-high rolling mills, and developed the feed tables, all at a time when the innovations were regarded with high disfavor as the fanciful theories of a visionary; as an experimenter, he developed structural shapes better suited for fabrication than any previously rolled and constructed the famous 125-ton steam hammer, the largest built up to that time and was forced to unique lengths in engineering to secure a steady foundation for it in the swampy land; as an inventor, he first produced the single steel plates that laid the foundation for the iron clad Dreadnaughts of today and added to the annals of this country, the victory at Santiago.

His Honesty

But above all he lived the life of a Man. For this assertion we must turn not to his own modest introspection but to the laudatory admiration of his firm friends. A man of great strength of character and resourcefulness, but withal gentle and considerate. A man who insisted that the workmen, who had labored beside him, be honored along with him. A man who wished always to share his plaudits with his co-workers. In his old age, with his life's battle over and his work done, his friends honored him as a man who merited the description given many years before, by the then secretary of the navy, "the most honest man I have ever known."

John Fritz was born on August 21, 1822, in Londonderry township, Chester county, Pennsylvania, the eldest child of a family of seven, three sons and four daughters. His father, George Fritz, was of German birth, while his mother, a native born Pennsylvanian, was of Scotch-Irish descent.

His father has been called "one of Nature's noblemen." He was a man of high moral standards and early impressed upon his son the importance of absolute integrity, energy and economy. From his mother he learned to read and revere the Bible and in his own words, the moral and religious training received in his childhood was the most important he could possibly have obtained.

A story told of the Spartan-like courage of his mother aptly illustrates the rigorous training John Fritz received. In the days immediately following the first battle of Bull Run, Mrs. Fritz was pursuing her household tasks one morning when a slender lad entered the house. "Mother," he said, "I have enlisted; I am going to the war." The mother turned and replied, "Well, my boy, never let me hear that they shot you in the back." The boy was the youngest brother of John Fritz.

The little log school house was the only institution of learning that John Fritz ever attended unless we consider the school of life, from which he graduated with such high honors. One of his friends has said that we should rejoice that there were no universities and hardly any schools in reach of Chester county, Pennsylvania. If there had been, America might have lost a John Fritz. He would have become a great force, but shaped and fashioned along more commonplace lines.

At the age of 16, the boy John began his connection with the industry that he did so much to elevate and broaden in his 55 years of active work. One might well say his seventy-four year association, for until the beginning of his last sickness, his innate energy would not permit of the complete relaxation that he merited. He daily spent a few hours at his desk, caring for the mass of consulting work that reached him unsolicited.

It was in 1838 that he entered a machine shop at Parkesburg, Pa., and served his apprenticeship. At its completion, he took up blast furnace work and was associated in the building of several early-day furnaces. In 1846, he assumed charge of the Norristown Iron Works at Norristown, Pa., holding the reins there until 1849, when he removed to Safe Harbor, Pa., to pursue mechanical engineering work.

At Cambria

Five years later, he moved to Johnstown, Pa., and as chief engineer and general superintendent began the rebuilding of the Cambria Iron Works. He was then 32 years of age, but was soon familiarly termed "the old man" by the employes. It was here that he began to assert his mastery of steel making and with the assistance of his brother completely changed the rolling mill practices of the times. These innovations included the three-high blooming mills with automatic tables and the three-high rolling mills, as well as the placing of the feed tables on a practical basis.

In a letter written many years ago to the editor of THE IRON TRADE REVIEW, Mr. Fritz described the obstacles he was forced to overcome in carrying out his projects.

"In order to fully appreciate the difficulties that had to be encountered," he wrote, "you will have to go back to about the years 1854 to 1857 and learn the conditions of the rolling mills at that time and the then existing prejudices against any improvements. When I first suggested the improvements at Cambria, which were afterwards made, I was considered a visionary schemer—just the man to ruin any company which would give him the opportunity to do so. This fight I had to make alone, as the proprietors, foremen and workmen had but little, if any, faith in what I then proposed to do, and they all had to be educated up to it. This was a very difficult task, as they were very generally impelled by prejudices, which are much more difficult to change than honest convictions."

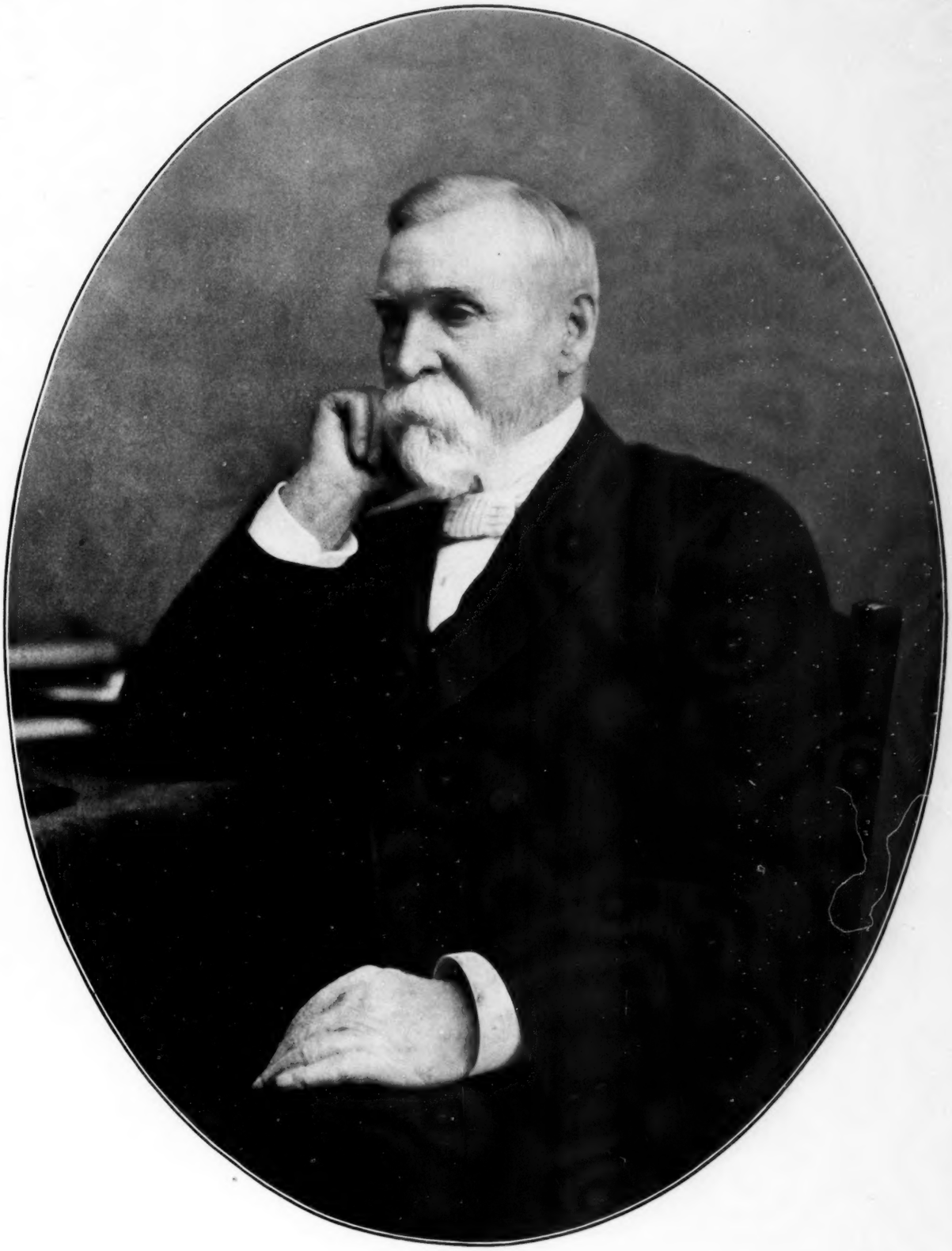
At Bethlehem

After Mr. Fritz left the Cambria Iron Works in 1860 and began the erection of the Bethlehem Iron Co.'s works, his brother, who had been associated with him in his earlier work, assumed charge and it was under his supervision that the first steel rails rolled in the United States were made. The brother was also an engineer of ability and Mr. Fritz frequently declared that, "but for his untimely death, George would have ranked as one of our ablest engineers."

It was at Bethlehem that Mr. Fritz's unusual powers of discerning the drift of industrial movements were first apparent. This ability to see ahead of the times and prepare for any new trend of the industry was one of the traits most instrumental in his success.

The richness of the Lake Superior ore ranges were just beginning to become apparent when Mr. Fritz saw that the Pittsburgh district, using the best of these Bessemer ores, was destined to forge ahead of eastern Pennsylvania in rail making, and he began to cast about for other channels for profitable operations.

The manufacture of armor plate had been attempted in Europe with some degree of success, but had been neglected in this country, and Mr. Fritz bent his energies in the direction of solving the then unknown problems to be met in plate manufacturing. The measure was necessary, he thought, as one which might prove the salvation of the Bethlehem plant. No established foundation existed



JOHN FRITZ
Aug. 21, 1822—Feb. 13, 1913

Supplement to
THE IRON TRADE REVIEW
Feb. 20, 1913

upon which he could begin his work, for while failure had been frequent, successes had been infrequent and oftimes more negative than positive.

The government test given the Bethlehem plates was an event of much moment to Mr. Fritz. He had built his plant and turned out the solid steel plates. Army and navy officials were doubtful of the strength of the new plates, but Mr. Fritz was confident that it was the one armor plate that could withstand the steel projectile without cracking or losing its shape. A compound plate, constructed by a rival concern, was also tested at the same time.

Mr. Fritz gives the following account of his emotions during the day of the trial. "On the day of the trial, Lieut. Jaques was sent to Annapolis to witness the test. Expecting to hear from him at about two or three o'clock, and not hearing from him, my anxiety increased. At six o'clock I went home from the works with a terrific headache. I got a cup of tea and a piece of toast, and lay down on the sofa, wondering what would be the consequences if the solid steel plate failed. At about eight o'clock, a telegram came. My wife received it and said, 'Here is a telegram for you.' I said, 'Open it and read it.' She opened it, but said she could not read it. I asked her for what reason and she said she did not understand it. I said, 'What does it say?' She replied, 'Compound something, knocked to smithereens.' I got up, but waited anxiously to hear how the solid steel plate stood the test. The telegram said, 'Solid steel plate stood the test.' Imagine my relief!"

His Carefulness

His judgement was vindicated and the future of the great armor plate plant, in which more than a million dollars had been invested, was assured.

It was Mr. Fritz's axiom in conducting the Bethlehem plant that any defect in a piece of steel must be called to his attention and for him this served as sufficient reason for rejection. The works had been erected on a conservative basis and for the sake of economy a large part of the machinery was built at the works from designs prepared by Mr. Fritz. His work had been well done and the products of the plant soon won a reputation.

Inspectors from purchasing companies were frequently stationed at the works to inspect the shipments, but his workmen regarded this as a waste of money.

"If it's good enough for Uncle John," said one of them, "it's good enough for any of these inspector fellows."

In 1893, Mr. Fritz severed his active charge of the Bethlehem plant after a third of a century of service.

In more recent years, several notable gatherings have been held to do honor to the great engineer. Twice birthday celebrations have been held at which the leading engineers and business men of the country have gathered to do him honor. His acquiescence to these celebrations was obtained with difficulty and only in response to the plea that it would please his friends.

Universally Admired

The guest lists at these celebrations were indicative of the universal esteem in which Mr. Fritz was held in all walks of life. There were present leaders in the iron and steel industry, army and navy officials, and men high in technical and educational circles. At the personal request of Mr. Fritz, about a score of the machinists and mill hands who had worked under him at Bethlehem were also in attendance.

He was honored many times, having been elected to the exclusive honorary membership in the Iron and Steel Institute, given an engraved message of appreciation by the American Society of Mechanical Engineers, elected unanimously to the position of honorary vice president for life of the Iron and Steel Institute and awarded the Bessemer Gold Medal. He was also given degrees by three universities and an institute of technology besides honorary membership in a number of engineering societies.

He was made a member of the American Institute of Mining Engineers the year following its organization and was made president in 1894. The American Society of Civil Engineers made him a member in 1893 and an honorary member in 1899. The American Society of Mechanical Engineers elected him to membership in 1881 and chose him as president in 1895. He was one of the first men elected to membership in the American Iron and Steel Institute.

He was a trustee of Lehigh University, South Bethlehem, Pa. About four years ago he informed the president that he had revoked the provision in his will by which he had given money to the university and intended to have the fun of spending the money himself. In spite of his 87 years, he set about preparing plans for a new engineering laboratory and after rejecting various plans, became his own architect and drew up plans for the building after the style of the large shop he had erected some years before at the Bethlehem Steel Works. The building is completed and is used by the students for testing materials and making commercial tests of materials of construction for manufacturers.

The John Fritz gold medal fund was provided in 1902, money being raised by subscriptions and a balance of $4,000 left, the interest on which annually provides for the purchase of the gold medal. The obverse side of the medal is a bas relief of Mr. Fritz and, as stated in the rules adopted, the medal is to be given for notable scientific or industrial achievement. Those who have received the medal are John Fritz, Lord Kelvin, George Westinghouse, Alexander Graham Bell, Thomas Alva Edison, Charles T. Porter, Alfred Noble, Sir William H. White, and Capt. Robt. W. Hunt.

The medal was awarded Mr. Fritz at the celebration of his eightieth birthday, held at the Waldorf Astoria hotel in New York, in 1902. More than 500 were present. Col. Henry G. Prout served as toastmaster and the medal was presented by John Thompson. Among those who were present were Gen. Eugene Griffin, representing the army; Rear Admiral Melville, for the navy; Dr. R. W. Raymond, for the mining engineers; George S. Morrison, for the civil engineers; Capt. Robert W. Hunt, for the mechanical engineers, and Prof. Elihu Thomson for the electrical engineers. Messages of greeting were read from distinguished men all over the world, who were unable to attend the banquet.

His Greatness

John Fritz's friends dispute as to what quality most clearly showed his greatness—none disputes his greatness. One admires his sturdy breaking down of the walls of privation and prejudice; recalls him as the sympathetic and sound counsellor; can not forget the army of men he trained to carry on the work when his hands failed him; praises his innate qualities and his manner of impressing upon others his ability for his work; but in the words of his friend, John Alfred Brashear, written several years ago, "the world knows Uncle John Fritz as the great engineer; his loved ones and we, his friends of ye olden time, know him as a man among men. It is such men that

'Give us the glad good morning
As we pass along the way,
And leave the morning's glory
Over the livelong day.'"

LARGE INCREASE

In Earnings Shown by Republic Iron & Steel Co.

During the six months ended Dec. 31, 1912, the Republic Iron & Steel Co. booked the largest volume of business ever taken for a semi-annual period, and also netted a large increase in earnings, according to a very favorable financial report covering that period, which has been issued. The total profits for the period were $2,601,703, an increase of $1,130,891 over the corresponding period in the previous year. The net profit was $2,226,381, compared with $1,168,110, or a gain of $1,158,271. After allowances for dividends on the preferred stock, it is shown that the company earned at the annual rate of about 6½ per cent on the common stock. The comparative income statement of the company for half years ended Dec. 31, 1912, and Dec. 31, 1911, is as follows:

	1912.	1911.
Net earnings	$2,570,574.31	$1,470,812.63
Other income	31,129.41	*
Total profit	$2,601,703.72	$1,470,812.63
Depr. and Renewal	251,595.65	180,694.09
Exhaust. Min.	123,726.39	122,007.97
	$375,322.04	$302,702.06
Net profit	$2,226,381.68	$1,168,110.57
Int. on Bonds	$467,295.31	$369,338.26
Net profit for div'ds.	$1,759,086.37	$798,772.31
Surplus July 1, 1912.	$5,339,891.21	
Surplus July 1, 1911.		$5,362,445.85
	$7,098,977.58	$6,161,218.16
Div. on pref. stock:—		
One quarterly	$437,500.00	
Two quarterly		$875,000.00
Net surplus	$6,661,477.58	$5,286,218.16

The unfilled orders of finished and semi-finished products, which include nothing but fixed contracts and eliminates sliding scale contracts, amounted to 613,053 tons on Dec. 31, 1912, compared with 414,431 tons on Dec. 31, 1911. Pig iron orders were 92,757 tons on Dec. 31, 1912, and 158,392 tons on Dec. 31, 1911.

On the general operations of the company for the half year, Chairman Topping says:

"The statement for the six months period shows that we have not only realized the largest volume of business ever recorded for a semi-annual period, but a most substantial increase has been realized in net earnings applicable to dividends; the aggregate of the current six months earnings amounting to $1,759,086.37. The increase in net profits is due largely to improvement in market and trade conditions; substantial additions, however, were made through reduction in costs due to mechanical improvements and efficiency of operations. Important extensions to productive capacity and further improvement to the company's general equipment are under construction, the principal items being the construction of two 60-ton open-hearth steel furnaces, four new merchant bar mills, by-product coke plant of Koppers type, daily capacity 1,000 tons; the unexpended balance covering the cost of these improvements being approximately $3,000,000. Ample funds are in hand to cover the cost of all improvements now under way. The net working assets as of this date are $13,875,620.97, and the financial condition of the company was never stronger. The only financing contemplated during the coming year will be that required to refund outstanding collateral notes to the aggregate amount of $3,000,000, due Nov. 30, 1913, which notes represent temporary financing on capital account; bonds, however, are held in the treasury for the redemption of these notes unless other provision for payment be authorized."

Hereafter the semi-annual report of the company will be issued as of June 30 of each calendar year and the annual report as of Dec. 31.

GREATLY INCREASED

Were Earnings Reported by Lackawanna Steel Co. Last Quarter.

The issuance of the report of earnings of the Lackawanna Steel Co. for the fourth quarter of 1912 rounds out the calendar year and shows that the company in that period increased its total income by $1,437,510, to a total of $4,472,522. The surplus for the year is shown to bave been $1,008,811, an increase of $926,008. These figures may be modified slightly when the complete annual report of the company is made public in the near future.

Unfilled orders of the company on Dec. 31, 1912, were 626,996 tons, compared with 289,971 tons on the same date of the previous year, an increase of 337,025 tons. The earning statement of the company compared with 1911, is as follows:

	1912.	Increase.
Manufacturing income	$3 728,783	$1,278,685
Other income	743,769	158,855
Total income	$4,472,552	$1,437,510
Int. on bonds and deb.	1,749,958	*42
Balance	$2 722,594	$1,437,552
Sing'g fund, exhib., etc.	577.833	317 777
Deprec. and renewals	1,135,950	193,766
Total deductions	$1,713,783	$511,543
Surplus	1,008,811	926,008

*Decrease.

The J. G. Brill Co., Philadelphia, has issued its annual report for the year 1912. On a combined output of $7,842,090, the company's five plants earned total profits of $1,054,851.

MAKES REPORT

American Iron & Steel Mfg. Co. Shows Large Assets.

The thirteenth annual report of the American Iron & Steel Mfg. Co., Lebanon, Pa., for the year 1912, was issued on Feb. 12. In it President James Lord makes the following statement to stockholders:

"Dividends at the rate of 7 per cent annually, and amounting to $388,500, were paid during the year.

"In addition there was added to the value of real estate, plants and equipment $83,477.24; and $50,000 was added to the allowance for depreciation of plants and equipment, the total of which now amounts to $930,000."

The balance sheet for the year ended Dec. 31, 1912, follows:

Current assets:—	
Cash:—	
In banks	$461,920.96
On hand	4,554.71
Total	$466,475.67
Bills rcvble.	.....
Ac'ts rcvble.	725,995.56
Inventory	1,763,461.44
Insurance and taxes:—	
Unexpired value	6,645.92
Total current assets	$2,962,578.59
Fixed assets: Real estate, plants, and equipment	$6,004,139.31
Less allowance to provide for depreciation	930,000.00
Total fixed assets	$5,074,139.31
Total assets	$8,036 717.90
Current liabilities	.....
Capital liabilities:—	
Capital stock, pref.	3,000,000.00
Capital stock, com.	2,550,000.00
Total liabilities	$5,550,000.00
Undivided profits, subject to payment of dividends	2,486,717.90
Total	$8,036,717.90

Eight-Hour Day Causes Decrease

The annual report of the Fore River Ship Building Co., Quincy, Mass., has just been made public, showing a surplus of $236,481 against $517,474 at the close of the previous year. In his statement to the stockholders, President F. T. Bowles says, relative to the decrease, as follows:

"The company received a contract from the United States government early in the year 1912 for the construction of the battleship Nevada, which contract provides that it is to be built in a yard which has established an eight-hour day. On account of this and other naval work it became necessary to place the entire plant on an eight-hour day on Nov. 4, 1912. This step, together with considerable unrest among employes and most serious delays in receipt of important materials by sub-contractors, has resulted in a decrease in the surplus during the past year of $281,000."

LATEST MACHINERY NEWS COLLECTED IN LEADING MANUFACTURING CENTERS

In New York, machinery dealers generally are satisfied with the volume of business, although there has been no marked improvement in the number of orders during the past week. Machine tool sellers report a better aggregate of orders for the first half of February than for the corresponding half of January. Inquiries also have come out at a better rate this month. It is not regarded as likely that anything definite will be done on the large Boston & Maine list of machine tools before late in March. The purchasing department was flooded with bids on the list—over 100 separate estimates being received. The number greatly exceeded what had been expected, and has caused considerable loss of time in handling them. Several railroad companies are inquiring for one or two machines in the New York market, but recent business from this source has been very light.

In Pittsburgh, an excellent volume of business continues to be enjoyed by interests manufacturing and selling light and heavy machinery. Rolling mill manufacturers have enough orders on their books to assure maximum operation through the first half of the year, and machine tool builders are well equipped with orders. An interest at Fort Wayne, Ind., has closed for a large slab milling machine and several sales of cold saw cutting machines and planers are reported. Boring mills, reamers, punches and shears continue to be in good demand, and considerable second hand machinery is being sold. A number of tentative inquiries for second and third quarter deliveries are pending.

In Chicago, there is no apparent slackening in machine tool buying and some dealers report a marked increase in business during the past week. The most of this activity, however, is the result of inquiries for small lots of tools, and although some of the larger industrial concerns have not fully covered for their requirements, they are following a policy of taking a few tools at a time. Some railroads are important factors in the market and it is understood that some of those which previously issued large lists have not entirely closed on them. The predictions of an early spring are causing considerable preparation for new construction, and other indications in the trade appear to point to a very active market a little later in the season.

In Cleveland, promising conditions continue to prevail in the machine tool market, and the number of new specifications received last week assures a prevalence of existing conditions for some time ahead. The number of contracts closed during the past week was not as great as in the three or four weeks immediately preceding, but there is a large amount of prospective business in sight, and dealers unite in taking an optimistic view of the machinery market. The central Ohio steam shovel interest issued another supplementary list this week, bringing the number of tools on which bids have been asked up to about 50. The entire list will comprise 72 tools.

In Cincinnati, the sale of milling machines has increased since the first of the month until this product is now on about an equal basis with radial drills and lathes in the number of sales being made. New business, however, in all of the above lines, is none too good, and is somewhat below that of the last few months of 1912. A noticeable fact, also, is that a number of the smaller manufacturers of machine tools here with whom business has been very dull for some time, are beginning to obtain orders, while some of the larger manufacturers are falling off somewhat. Orders are about evenly divided between the domestic and foreign trade. There is much buying in sight, especially from the railroads, but both the sellers and the buyers are showing an inclination to postpone negotiations until after the policy of the new administration can be better determined.

New Construction

The Standard Chain Co., Chillicothe, O., is completing its new plant for operation March 1.

The Manitoba Bridge & Iron Works will erect a new gray iron foundry building at Winnipeg, Man.

It is reported that the Norvial-Compton Scraper Co., Pixley, Cal., is planning to make improvements to its plant at that place.

The Kennett Motor Truck Co., Cincinnati, has ordered plans from Stewart & Stewart, architects, for a two-story garage.

The C. W. Raymond Co., Dayton, O., is planning a $10,000 structure to be used as a steel plant. The concern manufactures machinery. The contracts for construction have not yet been let.

The Toronto Hardware Co., Toronto, Ont., will build a galvanizing shop and warehouse in that city at a cost of $13,000.

The Canadian Western Lumber Co. is erecting a large cedar plant at a cost of $400,000 at Fraser Mills, B. C., employing 200 men.

Machine shops are being built at Allouez, Minn., by the Great Northern railroad, and ore dock No. 2 is being repaired at a cost of $250,000.

The Clara Mfg. Co., Gastonia, N. C., will build an additional mill building 72 x 120 feet to house additional equipment, including 3,700 spindles.

The G. Haarmann & Co., iron works, Springfield, Mass., will have its capacity doubled by the addition of new buildings as contemplated.

Erection of a crushing plant is about to be started by the New Jersey Zinc Co., Allentown, Pa., on property recently purchased.

Plans are being drawn for a machine shop, 56 x 70 feet, one-story, with a wing, 25 x 46 feet, for Harrison Safety Boiler Works, Philadelphia.

The Philadelphia Electric Co., Philadelphia, will build an addition to its boiler house at Robbins street and Delaware river, that city.

It is reported that the construction work will begin shortly on the new plant which the Baldwin Locomotive Co. will build at Calumet, East Chicago.

New car shops for the Illinois Cen-

tral railroad at East St. Louis, Ill., to replace those destroyed by fire a year ago, are being erected at a cost of $30,000.

The firm of Marshall Sons & Co., Gainsborough, England, manufacturers of tractors, will most probably erect a large assembling plant at Saskatoon, Sask.

Cowley, Clark & Co. will erect two brick factory buildings at 262 to 280 Vanderpool street, Newark, N. J. The buildings will be 30 x 70 feet and 30 x 140 feet, one-story.

The Taylor-Bramley Co., Chicopee, Mass., will start operations at once on a new factory building 30 x 75 feet, four stories, of brick. The cost is estimated at $18,000.

The Cleveland Galvanizing Works, Cleveland, will build a five-story addition to its plant, of reinforced concrete, to cost $25,000; W. J. Carter, architect, is preparing plans.

The Northwestern Fuel Co., St. Paul, is to spend about $200,000 for rebuilding docks, Superior, Wis. The company has increased its capital from $3,000,000 to $5,000,000.

The new plant of the Ontario National Brick Co. is being built at Cooksville, near Toronto, Can., and should be ready for operation by May 1.

A. B. Ormsby, Ltd., manufacturer of fireproof doors, roofing, etc., will erect a new five-story building on King street, East Toronto, Ont., at a cost of $100,000.

The Caswell Cotton Mills, Kingston, N. C., will double its mill capacity, erecting an addition of 100 feet, two stories, to accommodate new machinery.

The Gurney Foundry Co. has been granted permission to construct a tunnel across Cawthra avenue, Toronto, Ont., to connect its foundry with its new car shop.

The new plant of the Olean Electric Light & Power Co., Olean, N. Y., is rapidly nearing completion. When fully equipped it will represent an outlay of over $100,000.

The Kales-Haskel Co., Detroit, advises that it is erecting a two-story brick addition to its factory, made necessary by increased volume of sales.

J. B. Laberge & Sons will erect a large planing mill and sash and door factory at Sudbury, Ont., equipped with the latest machinery, and employing 40 men.

The Atlantic Radiator Co., Huntingdon, Pa., advises that work on the new buildings and extensions will be commenced as soon as the weather permits and that its force of molders and mechanics will be increased as fast as it is practicable.

The ratepayers of Chatham, Ont., have passed a by-law making concessions to the Chatham Auto Wheel Co., and a factory costing $40,000 will soon be erected in that town. (Noted Feb. 13.)

Blumenthal Bros., Philadelphia, have let a contract to William R. Dougherty, contractor, including the erection of a factory building and a brick boiler house at the corner of Margaret and James streets.

The Wheeling Electrical Co., Wheeling, W. Va., has been granted a franchise for the construction of a power transmission line from Bellaire to Warnock, W. Va.

The Wolverine Motor Supplies Co., Detroit, Mich., advises that plans for the proposed 74 x 84 foot, two-story, addition to its plant have been postponed for the present.

It is reported that the Modesto Mfg. Co., Modesto, Cal., recently incorporated with a capital of $100,000, will erect a plant for the manufacture of scrapers and potato diggers.

The City of Ottawa will shortly proceed with the construction of the Bronson avenue viaduct. This structure will be of steel with concrete abutments, and will cost approximately $120,000.

Immediate rebuilding of the burned mill of the Porter-Wadley Lumber Co., at Alexandria, Tex., has been decided on and new machinery has been ordered. The loss was $75,000 with insurance of $60,000.

The Energite Explosive Co., whose plant at Haileyburg, Ont., was wrecked by an explosion some time ago, will build its new plant at Waddifield station, 12 miles from North Bay. Construction will be rushed.

Brehm & Stehle, Philadelphia, are having erected three concrete and steel factory buildings, by Charles W. Denny. The structures are to be five stories, 56 x 59, 56 x 79 and 25 x 54 feet.

The Duplex Metals Co., Chester, Pa., is preparing to erect another addition to its plant. The new building will be one-story, 85 x 102 feet, and will be used in the manufacture of copper wire.

A large saw mill employing 200 men inside, and 400 outside, will be erected at Don Creek, Alta., by The Upper Fraser River Lumber Co. of Montreal is the secretary of the company.

Negotiations have been completed by the town of St. Thomas, Ont., for the erection of a structural steel plant costing $100,000, and employing 160 hands. The company will be given a loan of $50,000 by the city for 15 years.

Gatlett & Foley, Olney, Ill., are to erect a sawmill and slack barrel stave plant at Harrisburg, Ark. The firm will build several miles of standard gage railroad to a timber tract recently purchased.

The John C. Hoffman Packing Co., Baymiller street and Central avenue, Cincinnati, has ordered plans from Glaser & Schwartz, architects, for plans for a three-story fireproof addition, 25 x 60 feet.

The Lewis Electric Welding & Mfg. Co., Toledo, O., is doubling the capacity of its machine shop and is adding a foundry of 10-ton capacity, to be completed by March 15. The concern has added a Rathbun-Jones gas engine.

The Cumberland Telephone & Telegraph Co. is planning the erection of a 10-story office building in Nashville, Tenn., where its home offices are located. A site has been purchased and an architect will be appointed shortly.

The Columbia Castings Co., Detroit, Mich., which specializes in aluminum castings for automobile and motor cycle parts, etc., has just finished an addition to its plant which will double its former capacity.

Armour & Co., Chicago, have been granted a permit for the erection of a one-story coaling tower and a one-story tank house at Forty-third street and Packers avenue, Chicago. R. C. Clark is architect.

A permit has been granted F. G. Clark & Co., 1031 West Thirty-seventh street, Chicago, for the erection of a one-story boiler house. R. S. Lindstrom, 3400 South Center avenue, is the architect. The approximate cost is $5,000.

Construction of the three sections of the St. John Valley railway between Centreville and Gagetown, N. B., and the Fredericton Grand Lake railway is proceeding. This work is being financed by the New Brunswick government.

The Macomb Sheet Metal Works, Macomb, Ill., will shortly begin the erection of a new building, 137 x 250 feet, one story, at a site on North Dudley street, Macomb. The new building will be modern in every particular.

Building operations on the new car works of the Canadian Car & Foundry Co., at Fort William, Ont., are progressing in a very satisfactory manner. The foundations have all been completed as well as the dock, and the erection of steel is being

proceeded with as rapidly as matrial can be prepared. The company will be turning out finished cars by next fall. The capacity of the plant will be about 10,000 cars per annum.

New management has taken over the Hempfield Foundry & Machine Co., Greensburg, Pa., principally Pittsburgh men. Buildings to double the size of the plant will be erected, a cupola built and electric cranes installed.

The Remington Arms Union Metallic Cartridge Co., of New York, has secured a site of 100 acres at Windsor, Ont., on which it will erect a large plant for the manufacture of cartridges. Contracts for the first unit have been let to the Canadian Frost Winchester Co.

The Chicago & Northwestern Railroad Co. is making preliminary plans for improvements at Green Bay, Wis., to cost $350,000. A new 40-stall roundhouse, new machine shop, ice house and modern coal sheds are included in the plans. The work is in charge of C. S. Hall, engineer of track elevation, Green Bay, Wis.

The Universal Wheel Co., Fort Wayne, Ind., manufacturer of automobile wheels, has approved plans for a new plant. Work will begin soon on the new buildings, which are to be of steel and concrete construction and afford about 65,000 square feet of floor space for manufacturing purposes.

The Wabi Iron Works Co., New Liskeard, Ont., is building new machine shops, which should be ready for operation in about three months. This company will manufacture machinery for saw and planing mills, stamp mills and equipment for mines. The president is A. J. Young, North Bay, Ont.

The Eberling Cement Machine Co., Lakewood, O., Hird street and the Nickel plate railroad, is rebuilding its plant. The new structure will be of wood and cement, about 50 x 65, with driers 30 x 125. Through the Cuyahoga Builders' Supply Co., the company is in the market for a conveying system.

The Emerson-Brantingham Co., Minneapolis, Minn., manufacturer of gas traction engines, has completed plans for an addition to its plant here, to cost $250,000. This company also recently purchased a site for an eight-story implement warehouse on Jackson street and the Union Pacific tracks, Omaha, Neb.

The Norton Griffiths Co., Ltd., St. John, N. B., ship builder, is erecting a ship-repair plant, and will establish a steel and iron works in that city. The factory building will be 836 x 205 feet, three-stories, estimated to cost $48,000. The boiler house will be 50 x 75 feet and is estimated to cost $8,000.

The Ideal Steel Wheel Co., Cincinnati, has now secured full title to the former plant of the Seufferle Cooperage Co., at Winton Place, Cincinnati, and will be in operation within a short time. All of the machinery needed at present has been secured, but the plant will probably be doubled in size within the near future. J. B. Fitch is president of the company.

The McCabe Hanger Mfg. Co., 425 West Twenty-fifth street, New York City, has purchased two plots of ground, 49 x 73 feet and 28 x 148 feet, respectively, adjoining its present site. The broker who effected the sale reports that a new factory is to be erected covering the combined properties of the McCabe company.

A new Canadian Northern railway line from Montreal to Levis has been authorized in a bill which passed the railway committee last week at Ottawa, Ont. The Quebec Rapid Transit Railway Co. also applied for incorporation. It will build a line from Quebec to the Isle of Orleans, including a bridge between the mainland and the island, together with a belt line in Quebec county.

The Hooppole, Yorktown & Tampico Railroad Co., Hooppole, Ill., has been incorporated with a capital stock of $100,000 for the purpose of constructing a railway line from Hooppole, Henry county, Ill., through Bureau county, to Tampico, Whiteside county, Ill. The incorporators include C. W. Groves, H. G. Rinel, George Mathis, and James Tonkinson, all of Hooppole, Ill.

The Cribben & Sexton Co., Chicago, maker of Universal stoves, advises that in the recent fire in its warehouse and mounting department, fire walls confined damage to one section, which was a complete loss, figured at $150,000, with 75 per cent insurance. The concern expects to have the burned section rebuilt in 60 days, and already has ordered machinery for reequipment.

The work of constructing the hydro-electric plant near Augusta, Ga., on the Savannah river is being rushed day and night. The foundation for the dam has been completed and the contractors say that the plant may be completed by January, 1914. The construction work is being done by J. G. White & Co., New York. The plant when completed will be operated by the Augusta-Aukin Railway & Electric Corporation and the Georgia-Carolina Power Co. The plant is designed for a capacity of 31,000 horsepower and will represent an expenditure of $3,000,000.

The Moser Mfg. Co., Kane, Pa., recently incorporated, is building a new foundry at that place to manufacture various oil well appliances patented by F. J. Moser, president and treasurer of the new company. These products have been manufactured in a small way for a year or more but the business has increased to such an extent that larger facilities have been demanded. The new foundry is expected to be complete and equipped and ready for pouring the first heat about March. The products for the present will be limited to gray iron and brass

Machine Tools

The Chicago & Northwestern Railroad Co. has issued a list asking for bids on a number of small tools.

The Co-Operative Motor Car & Repair Co., Nashville, Tenn., will equip a repair shop for automobile work. J. L. Sherrill may be addressed. The company has $4,500 capital stock.

W. P. Biddle, 110 East Vine street, Knoxville, Tenn., is seeking new and used machinery for plant to manufacture steel ranges; wants exhaust fan, punches, shears, brake tumblers, etc.

Machine tools will be required by the Cadillac Sales Co., which has started in business in Knoxville, Tenn. The concern has $10,000 capital stock. Ben A. Morton and T. T. Pace are interested.

A service station equipped with a number of machine tools will be established by the Wright Motor Car Co., which recently organized in Memphis, Tenn. It is located at Fourth and Monroe streets.

M. H. Wiltzius Statuary Co., 317 Milwaukee street, Milwaukee, Wis., is inquiring for a wood-turning lathe with iron bed, 10 to 12 feet long, 8 feet between centers, with a 12-inch or 16-inch swing, complete with countershaft.

Yost Bros., Hite, Pa., founders and machinists, whose foundry was completely destroyed by fire Jan. 30, advise that the loss was fully covered by insurance. As soon as the weather will permit they will begin rebuilding, using structural steel, and further advise that they will require complete new machinery equipment.

The Mead Morrison Mfg. Co., Cambridge, Mass., has plans out and bids are being accepted for six one-story structures, each 300 feet long and from 120 to 215 feet wide, covering about five acres. The company plans using one 30-ton crane, four 10-ton

cranes and four 5-ton cranes, numerous electric motors, boring mills, planers, lathes and grinding machines.

The Pere Marquette Railroad Co. has issued a small list asking for bids on machine tools as follows:

One 30 x 96-inch grinder for locomotive work.
One heavy car wheel boring machine.
One bench grinder.
One high duty back geared 16-inch shaper.
One guide bar grinding machine, 84-inch.

The Shirley Radiator & Foundry Co., the Union Trust Co., receiver, Indianapolis, Ind., advises that an extensive outlay is to be made by the company for core and pattern equipment, trolley system of I-beam construction, and equipment for handling products. It is planned to add tool machines, a mammoth combination reaming, tapping and facing machine and an assembling press adapted to the manufacture of screw nipple construction radiation. Other miscellaneous improvements to facilitate handling will be made. (Noted Feb. 6.)

Power Plant Equipment

The Pacific Gas & Electric Light Co., Woodland, Cal., is planning to erect a new gas plant.

A new plant is being constructed for the Whitewater Electric Light & Ice Co., Whitewater, Kan.

It is understood that tenders will shortly be called by Toronto, Ont., for new generators at a cost of $90,000 to supply 6,000 kilowatts of electricity.

The city council of Kendallville, Ind., has approved plans and awarded the contract for a new building for the city lighting plant, at $11,000. The total cost of the plant is estimated at $39,000.

The West Side Business Men's Association, of Evansville, Ind., is organizing a $100,000 company to establish an electric light plant. Competition with the company now doing business is desired.

The Chattanooga & Tennessee River Power Co., Chattanooga, Tenn., is to begin shortly the construction of a steam power plant of 20,000 to 25,000 horsepower, in connection with the waterpower plant at Hale's Bar, 15 miles from that city.

The new plant of the Ogilvie Flour Mills at Medicine Hat, Alta., will be completed and ready for operation by the first of May. Machinery will be installed for the production of 2,000 barrels a day, and will be added to until it reaches 4,000 barrels.

Plans for the enlargement of the power plants of the Stonega Coal Co., Stonega, Va., are being considered. The estimated total expenditure for the improvements which are contemplated is $200,000. A. H. Reeder is the general manager.

The trustees of the town of Gunnison, Colo., have ordered an issue of $15,000 in warrants for the building of a storage reservoir and enlarging the city power and light plant. A contract recently was signed with the Denver Machine Co. for the purchase of $10,000 worth of machinery.

J. R. Jones and others, Barbourville, Ky., who will equip a coal mine near Hazard, Ky., plan to establish a power plant sufficiently large to furnish current for the operation of a street lighting system in Hazard. All of the mining equipment will be electrically driven.

A large creamery, with power-driven machinery, is to be established at Knoxville, Tenn., by the East Tennessee Dairymen's Association, according to plans which have recently been announced. The chamber of commerce of Knoxville may be able to give information.

The Falls City Construction Co., Louisville, Ky., which has the contract for the construction and equipment of the factory of the Speedway Tire Co., Louisville, is now purchasing the engine, generator and motors which will be installed. Used equipment is desired. H. L. Lewman may be addressed.

The Nevada Valley Power Co., Reno, Nev., a corporation with a capital stock of $3,000,000 backed by Oakland, Cal., capitalists, is completing plans for work near Reno at a cost of several hundred thousand dollars. This company is associated with the Mono Valley Power & Light Co., which has a title to the headwaters of the Owens river.

Plans for an electric generating plant of 25,000-horsepower capacity are being prepared for the Cohoes Gas Light Co., Cohoes, N. Y. The plant will be established at the Mohawk river, where the company recently obtained a grant from the state land board, to be used for that purpose. It is estimated that upwards of $1,500,000 will be spent on the work.

The Thomas Yearsley Co., Philadelphia, whose plant was damaged by fire recently, advises that the loss is covered by insurance and that it will continue in business at the same location, 211 North Third street. The company is in the market for a 100-kilowatt, 220-volt, belted generator; 100-horsepower, two phase, 60-cycle, 220-volt, 900 revolutions per minute alternating motor; and a 50-horsepower, 220-volt direct current, motor.

Bids Asked

Bids will be opened Feb. 21 for the revised plans of the Hutchinson high school, Buffalo, requiring about 1,400 tons of steel.

Tenders are being asked for the construction of a bridge across the Miramichi river, near Fredericton, N. B., at a cost of $300,000.

It is reported that the Indiana General Service Co., recently incorporated, will soon receive bids for the construction of an electric light and power plant at Alexandria, Ind.

Bids will be received up to 7:30 p. m., Feb. 18, for a boiler of the horizontal return tubular type without dome, by the mayor and board of aldermen, Waycross, Ga.

Froman & Jibson, architects, 64 West Randolph street, Chicago, are taking bids for alterations on the machine shop and pattern shop of the American Can Co. at Maywood, Ill.

Tenders will shortly be called for the construction of buildings to cost $75,000, exclusive of machinery to be installed, for the Metal Specialties, Ltd., Moose Jaw, Sask.

Proposals will be received at the bureau of supplies and accounts, navy department, Washington, D. C., until Feb. 25, to furnish a number of locomotive reamers at the Charleston, S. C., navy yard.

The city of Pittsburgh, through the mayor and director of the department of public works, has asked bids on a "connection to the 60-inch Montrose rising main," for the Aspinwall pumping station. An appropriation of $10,000 has been made.

Bids have been received by the common council of Lawrenceburg, Ind., for the construction of a municipal electric light plant. Frank Globe is city clerk and Paul H. White, Union Trust building, Indianapolis, Ind., is consulting engineer.

Tenders for the steel superstructure of St. Clair avenue bridge will be received by the chairman of the Board of Control, Toronto, Ont., up to March 11. The bridge has a span of 100 feet, with approaches at each end, 40 feet in length.

Tenders addressed to the City Commissioners, Regina, Sask., will be received until March 15 for the supply of six 500-horsepower boilers complete with mechanical stokers and internal superheaters, for 200 pounds pressure.

Sealed proposals will be received by the general purchasing officer of the Isthmian canal commission, Washington, D. C., until March 5, for galvanized sheet steel, planished iron, babbitt metal, boiler tubing, steel pipe,

stove pipe, bolts, tools and other supplies.

Proposals endorsed "Proposals for Locomotives" will be received at the bureau of yards and docks, navy department, Washington, D. C., until March 1, for one narrow gage and two standard gage saddle-tank switching locomotives, delivered at the naval station, Pearl Harbor, Hawaii. Specifications may be obtained on application to bureau.

Tenders will be received by James Stuart, purchasing agent for Vancouver, B. C., up to March 5, for the following: 5,280 feet of 2-inch galvanized iron pipe with unions; 5,280 feet of 4-inch No. 8 lapwelded or weldless steel pipe; 167,000 feet of 6-inch No. 9 lapwelded or weldless steel pipe; 50,000 feet of 8-inch No. 7 lapwelded or welded steel pipe.

Sutherland, Sask., will receive tenders until Feb. 24, for the supply of the following: 8,650 feet of 12-inch steel pipe and specials: 9,775 feet of 10-inch steel or cast iron pipe; 4,000 feet of 8-inch steel or cast iron pipe; 18,800 feet of 6-inch steel or cast iron pipe and specials; 30 fire hydrants, 52 gate valves and one automatic air relief valve.

Tenders will be received by the chairman of the Board of Control, Toronto, until March 4, for concrete mixers, grading machines, tar kettles, road rollers, scarifiers, stone crushing outfit, centrifugal pumps, boilers mounted, hoisting engines and boilers, buckets, excavating machine, diaphragm pumps and hose and inspection rods.

Bids are being taken for the construction of a factory building, 119 x 73 feet, one-story, at Nineteenth street and Western avenue, Chicago. The owners are J. J. Dobes and Benjamin Jelinck, care of the Monarch Tool & Machinery Co., 79 South Clark street, that city. It is understood that the latter company will occupy the factory. H. W. Thomlinson, 64 East Van Buren street, is the architect.

Sealed tenders will be received by the town clerk of Bowmanville, Ont., until Wednesday, March 19, for several works in connection with waterworks and sewerage systems. Among the contracts is B: Constructing pump house; C: Constructing three reservoirs; D: furnishing iron pipes; E: Furnishing hydrants, valves, etc.; G: Furnishing electrically operated booster pump; S: Furnishing sewer pipes; X: Contructing sewage disposal works.

The United States treasury department, O. Wenderoth, supervising architect, advises that the following construction work and furnishings of equipment is open for sealed proposals:

Construction, complete, including mechanical equipment of the United States post office at Weatherford, Tex. The building to be one story and basement with a ground area of approximately 4,400 square feet; proposals received until March 24.

Mechanical equipment, except elevators and lifts, of the United States post office and court house at Dayton, O.; proposals received until March 19.

Construction, complete, including mechanical equipment, of the United States post office at Tifton, Ga.; proposals received until March 25.

Structural Contracts

The Hamilton Bridge Co. has been awarded the contract for the steel work on the erection of a boiler shop, blacksmith shop, and locomotive crane shelter in Hamilton, Ont., at a cost of $25,000, for the Steel Co. of Canada.

The Covington Architectural Iron Works, Covington, Ky., has secured the contract for the iron and steel to be used in the new building of the Windisch-Muhlhauser Brewing Co., Cincinnati. Several hundred tons of structural and architectural iron and steel will be required.

The National Lead Co., New York City, will extend its Jewett works, that city. The Jones & Laughlin Steel Co. is fabricating the steel involved, 800 tons.

The Worcester Pressed Steel Co., Worcester, Mass., has awarded the Eastern Bridge & Structural Co., of that city, the contract for the erection of a two-story steel addition to its press shop. The building will be 100 x 90 feet. Plans for a cold rolling mill, 150 x 90 feet, have been prepared by the Pressed Steel Co., and the contract for its erection will soon be awarded.

Bridge News

A concrete and steel bridge, 2727 feet in length, consisting of truss spans and a swing draw, is planned by the town of New Castle, N. B., at a cost of $300,000.

The civic works committee of Toronto, Ont., has approved of plans for a new bridge at Gerard street, to cost $200,000. The type of structure will be deck plate girder approach spans.

The finance committee of the Milwaukee common council has recommended the issuance of $175,000 in bonds to provide funds for the construction of a new bascule bridge across Milwaukee river at Buffalo street. F. G. Simmons is commissioner of public works.

Recent Contracts

The Boston & Maine Railroad Co. has let contracts for the erection of a group of freight houses at Ipswich, Mass.

The Kline Construction Co., Lima, O., has been awarded the contract for the new six-story Allen County Savings building, the contract price being $95,000.

The Vesta Coal Co., Pittsburgh, is having six 200-foot steel barges built. Barges involve about 150 tons of steel each and are being built by the Jones & Laughlin Steel Co.

The Dominion Coal Co., Sydney, N. S., has awarded the contract for the erection of the new 20,000-kilowatt electric plant at Waterford to Seamens, Ltd., of London, Eng.

The contract for the erection of a three-story addition to the P. & F. Corbin factory, New Britain, Conn., has been awarded the B. H. Hibbard Co., that city, for approximately $45,000.

The Gettins-Kopitke Co., Toledo, O., has been awarded the contract for the erection of the new factory building for the C. Well Mirror Co., Toledo, O. The building will be 40 x 125 feet.

The Wertlin Foundry & Machine Co., of Tacoma, has secured the contract for an $8,500 pump for a dredge for the Seattle port commission. Delivery is to be May 15. The pump will weigh 42 tons.

Notice has been received by the Little-Cleeker Construction Co., Birmingham, Ala., that it has been awarded a contract for constructing the court house at Athens, Ga., cost $135,000.

The Tulsa Boiler & Sheet Metal Works, Tulsa, Okla., recently awarded a contract for the construction of a modern factory building on a site in the East Tulsa factory district. C. B. Fahrquarson is manager.

Joseph & Joseph, Louisville, Ky., have awarded the contract for the erection of the National Theater, at Fifth and Walnut streets, in that city, to the Selden-Brack Construction Co., of St. Louis, at a figure said to be in the neighborhood of $200,000. It will be constructed principally of reinforced concrete.

The Hitchman Coal Co., of Benwood, near Wheeling, W. Va., has awarded a contract for an opening to a shaft 9 x 16 feet, and 250 feet deep for double cage equipment. A steel tipple to cover the shaft also has been ordered. Mine machinery will be purchased later.

The contract for the supply of $300,000 worth of water pipes in Montreal, Que., was awarded to R. D.

Wood & Co. The Canadian Iron Corporation made a protest against the awarding of this contract to R. D. Wood & Co. on the ground that they have no factory in Montreal, but the protest was ignored.

The Harrison Dust Guard Co., Toledo, O., has been awarded the contract for dust guards to be placed on 271 new locomotives for the Union Paicfic system and the Southern Pacific Railway Co. This is said to be the largest order ever placed for so many large locomotives, 183 of this number having 6 x 11 journals.

The Allis-Chalmers Co., Milwaukee, has received a contract for furnishing the entire equipment for the second half of the flour mill of the Maple Leaf Milling Co., Port Colborne, Ont. The Maple Leaf company operates the largest flour mill in Canada and produces 9,000 barrels a day. It is now duplicating its present mill.

Supt. Peck, of the New York state department of public works, has awarded canal contracts amounting to $2,664,000. The contract for erecting power stations and lighting and operating locks along the Erie and Champlain canals went to the McArthur Bros. Co., and Lord Electric Co., of New York. These aggregated $1,612,356.

The Pioneer Tractor Mfg. Co., Winona, Minn., manufacturer of gas engines, has announced that the Pioneer Tractor Co., Ltd., recently closed a contract with the Minneapolis Steel Machine Co., Minneapolis, Minn., for the steel in its plant at Calgary, Alta., and is expecting to start manufacturing tractors about July 1. Employment will be given to several hundred men. (Noted Feb. 6.)

The city of Worcester, Mass., has awarded the Chapman Valve Manufacturing Co., Indian Orchard, Mass., the contracts for hydrant and gate valves required by the water department this year. The hydrant contract involves $2,478 and the one for valves amounts to $1,824. The United States Cast Iron Pipe & Foundry Co., Philadelphia, has been awarded the contract for all the iron water-pipe required by the department this year, at a price of $24.10 a ton.

The Smith Gas & Power Co., Lexington, O., manufacturer of producer gas equipment, reports the following recent sales:

The Washington Market Co., Washington, D. C., a 300-horsepower anthracite producer; George F. Lasher, Philadelphia, two 300-horsepower anthracite producers where the engines will be furnished by the Bruce-Macbeth Engine Co.; the Canada Foundry Co., Toronto, Ont., a 300-horsepower producer to be installed at Moncton, N. B.; the Bruce-Macbeth Engine Co., a 300-horsepower anthracite producer for the Lehigh Water Co., Easton, Pa., a 200-horsepower bituminous coal producer for the Wilson Ice & Fuel Co., Wilson, N. C., and a 75-horsepower anthracite producer for H. Davis, Berlin, Md.; D. P. Smelser & Sons, New Windsor, Md., a 35-horsepower producer.

American manufacturers have been awarded contracts for a large amount of heavy equipment to be installed at British Columbia mines and smelters by the Granby Consolidated Mining, Smelting & Power Co., Phoenix, B. C. Crushing and sampling machinery, furnaces and converters will be furnished by the Traylor Engineering & Mfg. Co., Allentown, Pa.; compressors and blowing engines by the Nordberg Mfg. Co., Milwaukee; rotary blowers by the Connersville Blower Co., Connersville, Pa., hoists by the Brown Hoisting Machinery Co., Cleveland; electric haulage locomotives and cars by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and hydraulic turbines by the Pelton Water Wheel Co., San Francisco. Considerable auxiliary equipment will be purchased later as required. The company's main offices are in New York City.

Miscellaneous Machinery

The Clay Products Co., Castle Rock, Colo., is in the market for a 100-horsepower slide valve engine.

The city council of Richmond, Ind., has appropriated $70,000 for the installation of new machinery.

The National Metal Moulding Co., Economy, Pa., is negotiating for a 10-ton electric traveling crane for installation in the plant at that city.

The Hodges Fibre Carpet Co., Indian Orchard, Mass., has erected an addition to its plant and will intsall special machinery for making a new floor covering.

The Crucible Steel Casting Co., Cleveland, is in the market for a 2-ton electric furnace. The company is repairing and remodeling its plant at 801 Champlain avenue N. W.

The Barnes Safe & Lock Co, Pittsburgh, advises the erection of new works will require installing some new machines. The concern will manufacture fireproof safes, vault doors and bank vaults and safes. The officers are: President and manager, T. Barnes Newell; secretary-treasurer, John A. Newell.

The Canada Forge Co., Ltd., Welland, Ont., whose plant was burned recently, is rushing to completion a temporary building. The contract for the new forge has been given to the Standard Steel Construction Co., and is specially designed for the manufacture of forgings up to 40,000 pounds in weight. The new plant will be equipped with a 20-ton crane of 60-foot span, and two 5-ton cranes of 20-foot span; also a 20-ton electric crane runway of 50-foot span; steam hammers, hydraulic forging presses, and annealing and heat treating furnaces.

New Incorporations

(In order to assist the post office in delivering letters to new concerns, it is suggested that the names of incorporators be written in the lower left hand part of every envelope addressed to such new companies.)

The following manufacturing companies have filed articles of incorporation:

The Buch Foundry Equipment Co., Lancaster, Pa.; $5,000.

The Hollis Automatic Traction Co., Knoxville, Tenn.; $250,000; to manufacture and sell motor vehicles.

The Hayne Roller Mills Co., Gastonia, Va.; $100,000; by A. B. Rhyne and others.

The Lewisburg Foundry Co., Lewisburg, Tenn.; to operate a foundry and machine plant; $50,000.

The Rice Gasoline Drill Co., Wilmington, Del.; to deal in mechanical engines, drills and machinery; $2,500,000.

The Heck Machinery Co., San Antonio, Tex., $50,000; by M. F. Heck, I. C. Heck, H. I. Dempser.

The Brown Patents Co., Norfolk, Va., $25,000; to manufacture, buy and sell various devices and machines.

The Miller River Power Co., Springfield, Mass.; $1,000,000, by local interests.

The Logan Square Auto Supply Co., Chicago, $10,000, by Otto Schmidt, August J. Schmidt, Martha Perl, to manufacture automobile supplies.

The Paramount Metal Form Drying Co., Beaver Dam, Wis.; $10,000; by H. H. Thomas, George C. Dickens and Evan Evans.

The Illmo Sheet Metal & Mfg. Co., East St. Louis, Ill.; $2,500; by A. S. Atkins, F. F. Mertz and M. J. Klee.

The Morris Iron & Machinery Co., Springfield, Ill.; $2,500; by H. P. Morris, Frank M. McGowan, Jesse H. Thomas; scrap dealers.

Garfield Wire Cloth Co., Passaic, N. J.; $100,000; to manufacture wire cloth; by David La Bour, John Vander Plast, John Karl.

The Mead Electric Signal Co., Cleveland; $50,000; to build electric signal machines, etc.; by T. B. Bolton, F. H. Felton, F. W. Treadway, G. O. Campbell and C. F. Mead.

The Connecticut Mills Co., Hartford, Conn.; to take over the Connecticut mills at Danielson and manufacture flax, hemp and other tex-

tiles; $550,000; president and treasurer, Tracy S. Lewis; secretary, W. B. Fitz.

National Brass Co., Ltd., London, Ont.; capital, $40,000, to manufacture brass goods and plumbers' supplies; provisional directors, John F. Grant, Charles H. Ivey and others.

The Englewood Mfg. Co., Englewood, Tenn.; $50,000; by R. H. Hicks, J. M. Wilson, L. A. Copenhaver; to erect a plant and install machinery for manufacturing knit goods.

The Hall Mfg. Co., Cleveland; $20,000; to manufacture and deal in machinery; by S. Q. Kerruish, George W. Spooner, G. E. Hartshorn, W. S. Kerruish and L. H. Freeman.

The Jurgensen Adding Machine Co., New York City; $200,000; by August P. Jurgensen, William A. Cain, and Robert T. Wyse, 41 Shiloh street, Pittsburgh.

The Advance Manufacture & Novelty Co., Chicago; $10,000; to do a general manufacturing business; by William D. Martin, J. J. Krantz and C. W. Jones.

The Albert W. Smith Co., Ltd., Guelph, Ont.; capital, $5,000; to carry on business as plumber and electrician, provisional directors, Albert W. Smith, Laura I. Smith and Mary I. McBeth.

Anderson Co., Ltd., Toronto, Ont.; capital $40,000; to manufacture motor cars, engines, etc., provisional directors, George Anderson, Frank G. Anderson and James A. McHardy.

The H. M. S. Motor Co., New York City; $25,000; motors and engines; by Charles K. Starr, Joseph J. Myers, and George P. Harvey, 134 West Forty-ninth street.

The Diamond Stamping Works, Cleveland; $35,000; stamping, stamp and press work, dies; by J. C. Noyon, Phelps Crum, H. H. Henry, M. T. Gorton, Ross L. McCarthy.

Edison Storage Battery Co., Inc., West Orange, N. J., $10,000; electrical apparatus; by Harry F. Miller, William H. Meadowcraft, William G. Boe.

The Metal Shop Mfg. Co., Cleveland; $10,000; articles made from metal or sheet metal; by E. Grant Criswell, Mary L. Criswell, William T. Tengler, Frieda O. Tengler and George Bauder.

The Milan Coal & Coke Co., Fairmount, W. Va., to develop coal lands; $100,000; by Milan N. Glumicich, Julius Hoffman, Marvin L. Linn, Thomas W. Powell, Richard Hoffman, all of Fairmount.

The Superior Bed Spring Co., Napoleon, O.; $25,000, by Herman D. Sweinberg, Frank A. Theobold, John A. Mehring, Ernest Spengler, Marmaduke W. Canfield and Cora Sweinberg.

The William O. Chapman Co., New York City; $10,000; general worker in iron, brass, copper, etc., to manufacture wire, to install metal cages for banks, etc.; by William O. Chapman, 45 Eighth avenue, Brooklyn; Valentine Kromm, and Harold D. Chapman.

The J. K. Dimick & Co., Inc.; Philadelphia; $100,000; coal, coke, iron ore, etc.; by J. H. Goodapple, A. L. Detweller, John M. Gates, J. J. Granahan and J. D. Morreli, Philadelphia.

The A. X. L. Lubricating Co., Dubuque, Iowa; $10,000; by Frank W. Coates, William Carfels, L. G. Hurd and T. J. Fitzpatrick; to deal in inventions relative to lubricating and lubricants.

The William McClellan Co., Cleveland, succeeding the firm of William McClellan & Co.; to enlarge plant at 3444 Hamilton avenue.

The Interstate Specialty Mfg. Co., Buffalo, N. Y.; to manufacture metal novelties; $25,000; by O. B. Augusperger, G. A. Orr, E. H. Hunt, Buffalo.

The Braun Knifeless Scale Co., New York City; to manufacture automatic weighing machines; $100,000; by J. F. Curtin, H. O. Coughlin, T. K. Mallaby, New York City.

The Paltridge Metal Equipment Co., Chicago; $50,000; to manufacture and deal in metal furniture, building equipment, electrical specialties, etc.; by Richard W. Paltridge, Charles W. Denicke and Charles A. Stone.

The Pressed Steel Mfg. Co., New York City; under the laws of Delaware to buy, sell and deal in car trucks of all kinds; $25,000; H. O. Coughlan, Joseph F. Curtin, New York.

The Hoosier Warming & Ventilating Co., Muncie, Ind.; $5,000; to manufacture heating and ventilating devices; by E. S. Clevenger, E. V. Fitzpatrick and W. D. Fitzpatrick.

The Combined Protective Alarm Co., Chicago; $2,500; to manufacture and install burglar and fire alarm systems; by John Thorsen, E. E. Smeby, Frederick M. Walter and Alfred C. Anderson.

The Lawter Tractor Co., Newcastle, Ind.; $10,000; to manufacture and sell farm machinery; directors, Benjamin H. Lawter, Orville O. Carpenter, John C. Goodwin and William H. Goodwin.

The G. W. Bradley Axe & Tool Co., Inc., Albany, N. Y.; to manufacture tools of iron and steel and to operate a machine shop; $300,000; by Carson Breevoort, 15 Clark street, Brooklyn, D. Vail Applegate, 2181 Bedford avenue, Brooklyn; Maximilian T. Christopher, East Orange, N. J.

The Cuyahoga Spring Co., Cleveland; $20,000; to manufacture springs and metal specialties, by Emma Van Uum, John H. Van Uum, John A. Hoffman, Harry Plagenz and William G. Black.

The New Columbus Automobile Co., Columbus, O.; to manufacture motor vehicles; $30,000; by Jesse J. Brown, Lillian M. Brown, William E. McConnor, Charles E. Dennis and Edson B. Dennis.

The Federal Carbon Co., Lorain, O.; $1,000,000; to manufacture and refine carbonized products, and by-products; Charles Dick, Clay B. Steel, Ammon B. Critchfield, Ervin H. Thorp and James E. Dick.

The Standard Engineering & Drafting Co., Philadelphia; under the laws of Delaware to carry on a general drafting business, the building of bridges, etc.; by F. R. Hansel, Philadelphia; George H. B. Martin and S. C. Seymour, Camden, N. J.

The W. C. Newbury Co., Chicago; $25,000; to manufacture blacksmith supplies, etc.; by W. G. Newberry, A. C. Wheeler, F. Walsh, Chicago.

The American Automatic Protective Valve Co., Augusta, Me.; to manufacture and deal in valves and other devices; $400,000; president, R. S. Buzzell; treasurer, L. J. Coleman, Augusta.

The National Mill & Lumber Co., San Francisco; $100,000; to conduct plant to manufacture articles of wood, iron, paper, cement, etc.; directors, William E. Hampton, F. M. Kirsch, G. F. McArthur, H. P. Sackett, E. C. Pitcher.

The Baltimore Under Filled Stoker Co., Baltimore, Md.; to manufacture automatic stokers and like devices; $20,000.

The Bay State Car Wheel Co., Boston; to manufacture car wheels, etc.; $21,000,000; by J. B. Pierce and others, 60 State street, Boston.

The American Steam Gauge & Valve Mfg. Co.; to manufacture gages, valves, etc.; $500,000; by J. McCandlish, 299 West Canton street, Boston; R. B. Phillips, 208 Camden street, Boston; W. E. Phillips, Cambridge.

The Ruggles Mfg. Co., Boston; to manufacture machinery, etc.; $50,000; by H. R. Ruggles, Somerville; S. J. Byrne, Winthrop.

The Ripple Engineering Co., Cleveland; $10,000; to manufacture appliances, fittings and apparatus used in connection with or for illuminating; by M. C. Ripple, Clark Baker, E. E.

Leypold, H. A. Peters and George B. Marty.

The Fields & Nieser Co., Cleveland; $5,000; to engage in the general manufacturing and erection of sheet metal, iron and steel, by William W. Fields, George J. Nieser, Walter E. Myers, Raymond Schenkelberg and Adelaide Josephberg.

The J. Alex Sullivan Co., Cleveland; $10,000; to manufacture tools, implements, safety and industrial appliances and furnishings; by Roy Black, J. Alex. Sullivan, Edgar A. Smith, A. G. Newcomb and J. P. Lamb.

The Huntington Machine & Foundry Co., Huntington, Ind., previously mentioned; $125,000; by Christian F. Heinss Sr., H. E. Oskamp, V. A. Heinss, Edwin B. Ayres, F. E. Wiekerhiser; to manufacture and repair machinery. (Noted Feb. 13.)

The Stanford Metal Tie & Anchor Co., Inc., New York City; to manufacture metal ties, anchors, etc.; by William L. Brainard, Hotel Normandy, New York City; William E. Smith, Waldorf Astoria, New York City, and Frank H. Stanford, 1195 East Broad street, Elizabeth, N. J.

The Cordeaux Mfg. Corporation, Brooklyn, N. Y.; to manufacture machinery, etc.; $10,000; by Theodore H. Klein, 273 Halsey street, Brooklyn; John Winne, 534 West 124th street, New York City, and Walter Shulman, 40 West 127th street, New York City.

Recent Sales

The West Penn Steel Co., Brackenridge, Pa., has ordered a Kerr Economy turbine, driving a Dayton centrifugal boiler pump.

The Elliot Co., Pittsburgh manufacturer of power house accessories, has placed an order with the Laughlin-Barney Machinery Co., Union Bank building, Pittsburgh, for a 52-inch King high duty production boring mill, motor driven.

The Wheeling Sheet & Tin Plate Co., Wheeling, W. Va., has placed an order with the Laughlin-Barney Machinery Co., Pittsburgh, for a small Dietrick & Harvey open side convertible high duty planer.

The Best Mfg. Co., Pittsburgh, has placed an order for a Kerr steam turbine, manufactured by the Kerr Turbine Co., Wellsville, N. Y., and a Platt centrifugal pump, 600 gallons per minute capacity, built by the Platt Iron Works, Pittsburgh.

The Pittsburgh Valve, Foundry & Construction Co., Pittsburgh, has closed negotiations for an 84 x 84-inch x 18-foot Dietrick & Harvey open side convertible high duty planer, made by the Dietrick & Harvey Machine Co., Baltimore, Md. The machine was sold by the Laughlin-Barney Machinery Co., Pittsburgh.

The Laughlin-Barney Machinery Co., 1901 Union Bank building, Pittsburgh, reports the sale of a large Newton slab milling machine which will be shipped to Fort Wayne, Ind. the Laughlin-Barney interest also has sold six large Newton steel foundry cold saw cutting-off machines and two Newton rotary planers to be shipped to mills in the immediate Pittsburgh district.

New Buyers

The Central Mantel & Tile Co., Detroit, has begun business with a capital of $3,000, about one-half of the stock being subscribed and paid in.

With $150,000 subscribed and paid in property, the Universal Wheel Co., Detroit, has engaged in business with an authorized capital of $250,000.

William Peterson has organized the Salem Electric Co., of Salem, Kenosha county, Wis., and proposes to establish an electric light and power plant to serve the village. The company is capitalized at $4,000.

The Cleveland Light & Power Co. has been incorporated at Cleveland, Manitowoc county, Wis., by Charles Lorfield, August Erdman and Charles Wimmler, to establish an electric light and power plant.

The Hartford Auto Pump & Supply Co. has been incorporated under a Connecticut charter with a capitalization of $50,000 and business will be begun with $20,000. The incorporators are Henry F. Schale, Edward E. Tryon, and Thomas Lockwood.

The Indestructible Sign Co., Columbus, O., has been organized and plans are being made for the extensive manufacture of iron signs. C. A. Devine is the inventor and owner of the patents on the indestructible sign and machines, and the process of their manufacture.

The Canadian Creosoting Co., recently incorporated, has purchased a site in East Trenton, Ont., on which it probably will locate a plant costing $200,000, giving employment to over a hundred men. The new company will handle railway ties and wooden paving blocks.

The Sterling Hardware Co., Bluefield, W. Va., whose incorporation was recently noted, advises that it is capitalized at $100,000 to engage in a wholesale hardware business, and will do no manufacturing. A building will be leased. The officers of the company are: President and treasurer, E. H. Smith; vice president, F. M. Archer; secretary, R. C. Morrison.

The Shoe Dealers' Machine Co. has been organized at Berlin, Wis., by B. E. Scott, F. M. Huson, T. W. Hamilton and W. H. Wyman, to manufacture tools and small machinery for shoemakers and small shops. The company has been incorporated for $30,000.

The Ayer Mfg. Co. has been organized in New Haven under a Connecticut charter to engage in the manufacture of polishing and buffing powders and buffing wheels. It is capitalized at $15,000 and will begin business with half that amount. The incorporators are Una S. Ayer, Ruby Ayer, and Dawson W. Ayer.

The Calgary Clay, Coal & Coke Co., Ltd., has been incorporated under a Canadian Dominion charter, and has opened offices in Calgary, Alberta. The works will be located at Crow's Nest Pass. The company will also engaged in the coal and coke business, having acquired extensive limits in that district. The gas from the coal will be used in firing the clay products. A. F. McLaren, of Toronto, is at the head of the organization.

The Lewisburg Foundry Co., Lewisburg, Tenn., which has purchased the plant of the Sheffield Foundry Co., Sheffield, Ala., and removed its equipment to Lewisburg, plans the purchase of additional equipment and the enlargement of the business. W. T. Archer is general manager of the company, which is capitalized at $50,000.

Increased Capital

The Ohio Electric Co., Toledo, O., has increased its capital from $250,000 to $500,000.

Buchanan Mfg. Co., El Dorado, Ill., has certified to an increase in capital stock from $15,000 to $40,000.

Spengler Bros. Co., Rockford, Ill., special machinery builders, has increased its capital, $20,000, to $120,000.

The Royal Enameling & Mfg. Co., Chicago, has increased its capital stock from $175,000 to $200,000.

The Maxwell Hosiery Mills, Suffolk, Va., has increased its capital from $75,000 to $200,000, and plans extensions to its mill plant.

The Detroit Twist Drill Co., Detroit, has increased its capital stock from $150,000 to $300,000, and is expanding its factory facilities.

The capital stock of the Chicago Bridge & Iron Co., Chicago, has been increased from $150,000 to $600,000, and the number of the directors increased from five to seven.

The Lorain Electrical Construction

Co., Lorain, O., has changed its name to the Electric & Auto Co., and increased its capital stock from $10,000 to $20,000.

The Hope and District Power, Light & General Development companies, Hope, Alta., have applied for the right to dam the Coquahalla river, and will increase their capitalization to $3,000,000.

The Four States Coal Co., Pittsburgh, at its annual meeting, increased its preferred stock from $1,500,000 to $2,500,000. Of the increase $250,000 is to be issued as additional working capital.

Stockholders of the Northern Texas Electric Co. will hold a special meeting at Portland, Me., Feb. 24, to vote on an increase in the 6 per cent preferred stock from $4,500,000 to $5,000,000, and the common stock from $2,500,000 to $5,000,000.

Increase of capital stock by Birmingham, Ala., companies has been made as follows: Inter-Mountain Ore Co., from $3,000 to $150,000; Avondale Mills from $500,000 to $625,000; Jefferson Iron Co. from $3,000 to $300,000.

The Jackson Ornamental Bronze Iron Works, Jackson, Tenn., has increased its capital by $8,000, to enlarge its plant. Officers elected at annual meeting: President, J. C. Feksenthal; vice president, W. R. Sparkman; secretary-treasurer, J. J. Losier; general manager, T. B. Hardeman.

At a recent meeting of the stockholders of the Hydraulic Press Mfg. Co., Mount Gilead, O., the stockholders authorized an increase in the capital stock from $160,000 to $260,000. Many new improvements and plant extensions have been arranged for. A new erecting shop 80 feet by 150 feet will be built at once.

The Bennington Scale Co., North Bennington, Vt., has been reorganized and placed on a sound financial basis, with its capital stock increased from $30,000 to $60,000. The following officers have been elected: President, Clarence L. Holden; vice president, Arthur J. Holden; secretary and treasurer, W. I. Hare. The directors are: Arthur J. Holden, Clarence L. Holden, H. B. Barden, W. I. Hare and William H. Nichols.

At the recent annual meeting of the stockholders of the Cleveland Foundry Co., Cleveland, an increase in the capital stock from $400,000 to $2,000,000 was authorized. President F. E. Drury states that the company is capitalizing the surplus earnings that have been accumulating during its existence of 20 years and that a portion will be distributed in the form of a stock dividend, while a part will be placed in the treasury for future use.

Trade Notes

L. A. Tinnus, Bird Island, Minn., will open his machine shop March 15.

At the annual meeting of the Smokeless Powder & Chemical Co. in Philadelphia, directors were re-elected.

The Havana Metal Wheel Co., Havana, Ill., has secured an extension of its charter for 79 years.

The Weirton Steel Co., Weirton, W. Va., expects to have its new cold roll mills in operation by July 1.

The American Logging Tool Co., Chicago, has filed a certificate of dissolution with the secretary of state.

The Ramsey Implement Co., Devil's Lake, N. D., has bought the machinery stock of the W. R. Haig estate at Starkweather, N. D.

The Griffin Wheel Co., Chicago, has changed its name to the Griffin Co., and decreased its capital from $10,000,000 to $10,000.

The John B. Morris Foundry Co., Cincinnati, O., has bought property, 37 x 105 feet, on Richmond near Harriet street.

A branch of the Keystone Steel & Wire Co., Peoria, Ill., is to be opened at Fargo, N. D., with A. J. Dixon as manager.

George D. Whitcomb Co., machinery, Rochelle, Ill., is equipping its plant and will have it in operation about March 15.

The Noyes Machine Co., Portland, Me., manufacturers of brass specialties and propellers, is to establish a factory in St. Johns, N. B., for its European business.

The Wheland Co., Chattanooga, Tenn., is successor to the Chattanooga Machinery Co., manufacturer of band saw mills and saw mill equipment. (Noted Feb. 6.)

Reorganization of the Knoxville Smelting & Refining Co., Knoxville, Tenn., is going on and the name is to become the Knoxville Smelting Co., capital $150,000.

The Hydraulic Pressed Steel Co., Cleveland, which recently increased its capital stock, advises that it does not contemplate any particular additions or improvements.

The Ohio Brass & Copper Co., Cincinnati, will move to a new location in that city within the near future. The plant is at present located at 424 Elm street, and the new quarters will be at 412 Elm street, where a five-year lease has been secured.

The Wallace Concrete Machinery Co., Los Angeles, Cal., is making arrangements to double the output of its plant. This company recently added a traction concrete mixer to its line of manufacture.

The Herzog Iron Works, Minneapolis, Minn., whose plant at St. Paul was recently damaged by fire, plans to move to Minneapolis and erect a large factory. (Noted Feb. 6.)

The Hyde Park Supply Co., Cincinanti, will build a warehouse of brick and concrete, 80 x 100 feet, at Madison road and the N. & W. railroad.

The Greenfield Machine Co., Greenfield, Mass., manufacturer of grinders, recently moved into its new concrete building, after having purchased and installed all necessary equipment.

A mammoth exposition of "Made in Racine" products is being arranged by the Commercial club of Racine, Wis., and will be held some time early next summer in the largest hall available.

The American Packless Valve & Mfg. Co., Harvey, Cook county, Ill., recently completed its plant at 147th street and Page avenue, Harvey, and is just starting to manufacture a patented valve.

A joint office of the Walsh & Weidner Boiler Co., and the Converse Bridge Co., both of Chattanooga, Tenn., has been opened in the Brown-Marx building at Birmingham, Ala., with Paul Wright as manager.

President Robert of the Halifax, N. S., Electric Tramway Co. has announced that an expert will be secured to examine the plant and equipment with a view to extension and improvement.

The Richmond Radiator Co., New York City, has acquired the plant of the Reading Radiator Co., Reading, Pa., which it will operate in connection with its other plants. Grant Nagle and D. L. Adams will serve as local managers.

Abendroth Bros., Port Chester, N. Y., advise they have closed their store on Beekman street after several years occupancy and have opened a store and office at 27 West Forty-second street. Howard T. Gates will be in charge.

Rumors that the Universal Machine Screw Co. was about to remove from Hartford, Conn., arising from the sale of the machine building branch of its business, are denied by F. Goodwin Smith, manager of the concern. Sale of the machine building branch is to make room for enlarged output of screws.

The Imperial Sewing Machine Co., New Haven, Conn., has been organized and has taken over the plant of R. H. Brown & Co. Lewis A. Platt, of Waterbury, Conn., and R. H.

Brown, of New Haven, have an interest in the new concern, which is in the nature of a re-organization.

The H. W. Johns-Manville Co., announces the removal of its Newark, N. J. offices to 239 Halsey street. The new office and salesroom is on the ground floor with 4,000 feet of space for display of goods.

The Hertz & Hosbach Co., Ltd., Detroit, has merged its planing mill business into a stock company under the style of the Hertz-Bowerman Saw Supply Co., with authorized capital stock of $4,200, all paid in.

The annual meeting of the Canada Foundries & Forgings Co., Ltd., was held in Brockville, Ont., last week a net balance of $25,680 being reported for the year. A total of $68,813 had been spent during the year on the plant.

The Bolivar Foundry & Machine Co., Bolivar, Pa., which was partially destroyed by a tornado, Jan. 18, has repaired the damaged sections of the plant, and is again operating at full capacity.

About $10,000 will be invested by Henry Ebert in the establishment of the plant of the Queen City Boiler & Sheet Iron Works, Johnson City, Tenn., which will be in operation in something like two weeks. Mr. Ebert recently sold his interest in the Twin-City Boiler & Sheet Iron Works at Bristol, Tenn.

The Jackson Motor Shaft Co., which has just completed a new manufacturing plant at Jackson, Mich., succeeds the Hastings Motor Shaft Co. of that place. Winthrop Withington, of the Sparks-Withington Co., has been elected president, Fred L. Holmes vice president, John L. Allen treasurer and A. L. Mulholland secretary.

The business of the Anderson Wire & Steel Co., Anderson, Ind., is to be moved to Evansville, Ind., in the immediate future, according to an announcement from the business men's club of the latter city. This is one of a number of new industries recently located there, the business men's organization having raised a fund of $50,000 with which to induce manufacturing plants to locate in that city.

The annual meeting of the Island Smelting Co. was held on Monday, Feb. 6, at Toronto, Ont. The statement showed the assets to be $3,079,932, of which $3,054,291 represented the value placed by the company on its processes and patents. The shareholders ratified a by-law to remove the head office of the company from Toronto to Ottawa or Montreal. It was announced that Dr. Island would go to Trout Mills this week, to supervise the placing of the Island process in the smelter recently acquired by the company. The election of directors resulted as follows: A. E. Donovan, M. P. P., Toronto; Senator Taylor, Montreal; J. N. Ducharme, Montreal; James W. Michaud, Montreal; H. A. Stewart, Brockville; Dr. Island, Toronto, and S. J. Robins, Ottawa.

The Detroit Pressed Steel Co., Detroit, advises that it is planning increases in floor space and equipment that will triple capacity. These increases will be 130 per cent in the assembly floor space, 50 per cent in tool room floor space, a new side rail press of latest design for making rails at one operation at one stroke, and a corresponding increase in small bar and cross rail equipment. The new rail press will be double action, power driven toggle type with a capacity to handle ⅜-inch carbon steel cold.

The American Screw Co., Providence, R. I., has taken over the Rogers Screw Co., it will operate under the name of the Rogers Mills, as a part of the American Screw Co., which already operates the Eagle Mills, the Bay State Screw Co., and the New England Screw Co. The Rogers Co. is capitalized at $250,000, its plant is situated on Atwells avenue. The business was established in 1889, under direction of the late Edwin G. Angell, former president of the American Srew Co., and Charles D. Rogers.

The danger signal now used by the United States Steel Corporation, that of a red bull's-eye to warn employes of danger in certain parts of a factory, is gradually being accepted by Cincinnati manufacturers. Royal Mattice, who is the Cincinnati representative of the American Steel & Wire Co., is responsible for this movement, and efforts are now being made to make it universal. Among the Cincinnati plants which have adopted this system are the Cincinnati Fly Screen Co., the Cincinnati Mfg. Co., the Bromwell Brush & Wire Goods Co., the Cincinnati Iron & Steel Co., the Lodge & Shipley Machine Tool Co., The Queen City Forging Co., and the R. K. LeBlond Machine Tool Co.

General Industrial

Retiring directors of the Warwick Iron & Steel Co. were re-elected at the recent annual meeting in Philadelphia.

The General Railway Signal Co. has announced its intention to establish a foundry at Rochester, N. Y.

The Monmouth Plow Co., Monmouth, Ill., has filed a certificate of dissolution with the secretary of state.

The Knox Automobile Co., Springfield, Mass., was adjudged bankrupt recently by order of Judge Norton, of the United States district court, with liabilities of more than $2,000,000 and assets of $1,000,000.

Certificate of the reduction of the capital stock of the Missouri Iron & Metal Co., St. Louis, Mo., has been filed with the secretary of state.

The Taunton Autogenous Welding Co., Taunton, Mass., has started operations. Harry Carr is the proprietor and James Carr is superintendent.

It is probable that the Grafton Furnaces at Latonia, O., which have been idle for three years, will be put into operation this summer.

The premises of the Cellular Metal Co., Cincinnati, have been sold at auction by the receiver, J. R. Harlan, to Henry R. Meyers.

The Dominion Canners, Ltd., will erect a plant in Chatham, Ont., during the coming summer. The company's payroll will be $25,000 yearly.

The Canada Auto & Taxi Co., Montreal, Que., has gone into liquidation. The assets of the company are forty cars and a garage and outfit.

W. P. Biddle, Knoxville, Tenn., will establish a stove foundry. The manufacture of ranges will be one of the features of the business.

The Atlantic Coast Line, Pittsburgh, will spend $3,500,000, for equipment for a recently constructed road, affording an outlet for the Kentucky coal fields of the Consolidation Co.

The foundry of the Co-operative Stove Co., Bloomington, Ill., has been re-opened after a shut down. An advance of 5 per cent has been given the workmen.

The Standard Oil Co., of New Jersey, has taken out permits to erect three steel oil tanks at Third avenue and Passaic street, Newark, N. J. The estimated cost is $12,681.

The Bedford Iron Works, of 232 Rider avenue, Bronx, New York City, has filed a petition in bankruptcy with liabilities of $26,522 and assets of $8,680.

William A. Lincoln and others, Columbus, Ind., are planning the establishment of a chair factory which will cost $50,000. A site has been selected.

T. J. Greeneltch, doing business as the Imperial Metal Refinishing Co., Milwaukee, filed a voluntary petition in bankruptcy, giving his assets at $1,129, with $435 exempt, and liabilities as $1,254.62.

The Bethlehem Steel Co., South Bethlehem, Pa., is now operating all six of its blast furnaces, having blown in furnace "B" at its Lehigh plant last week.

Plans are being made for the organization of a planing mill company at Centreville, Ala., with a capital

stock of $15,000, most of which already has been subscribed.

The town of Regina, Sask., has appropriated $15,000 to establish a plant for producing gas from coal at Estevan, Sask., for domestic purposes. If successful, the plant will be enlarged.

The town of Penetanguishene, Ont., has passed a by-law authorizing the council to lend $25,000 to the Dominion Stove & Foundry Co. to extend its plant there.

About 50 sheet metal workers employed by the Peck, Anderson & Peck Co., Cincinnati, are on strike, because they were refused an increase from 35 to 40 cents an hour, or a decrease from nine to eight hours daily.

The Taylor Steam Specialty Co., Battle Creek, Mich., has bought property adjoining its plant, 36 East Jackson street, to enlarge facilities. Its capital stock of $20,000 may be increased soon.

Mayor Robinson of Moncton, N. B., and others are applying for incorporation as the Moncton Woodworking Co., with a capitalization of $30,000 to conduct a woodworking factory at Sunny Brae, N. B.

The Evans Chemical Co., Nicholasville, Ky., has secured a lease on land near Lexington, Ky., and will install mining equipment for the development of barytes and other ore deposits which have been located there.

The Aluminum Co. of America denies a report that it expects to build a $1,500,000 plant at New Kensington, Pa. The company has no plans under consideration at this time for the erection of a plant at that city.

The Fleetwood Metal Body Co., Fleetwood, Pa., has asked the city council to vacate a portion of Locust street adjacent to its plant to allow an extension to increase its output 50 per cent.

The Dominion Chain Co., Ltd., a branch of the Weed Chain Tire Grip Co., of New York, will establish a branch in Canada. The head office will be in Montreal and will be in charge of W. P. Kearney.

A branch of the Dixie Culvert & Metal Co., Atlanta, Ga., is to be started at New Orleans, a lease having been taken of the plant of the Panama Tank Co. William Tallent is to be manager.

The business of the Winnipeg Tool & Forging Co. has been purchased by Luther Holling, recently a tool expert in the Winnipeg shops of the Canadian Pacific railway, who will begin the manufacture of some new lines of goods.

The final dissolution of the George's Creek Coal & Iron Co., and the distribution of its remaining assets await the outcoming of a suit pending in the Maryland Court of Appeals, brought by Charles B. Peabody, of Philadelphia, and Henry C. Little.

The Cambria Steel Co., Johnstown, Pa., has received a couple of new yard locomotives from the American Locomotive Co.'s plant at Schenectady, N. Y. Engines are similar in type to those already in use by the Cambria company.

George E. Feeney, receiver for the T. B. Laycock Mfg. Co., Indianapolis, manufacturer of iron and brass beds, has been ordered by the court to offer the property for sale March 1. The appraised value is in excess of $400,000.

The plant of the Dominion Iron Works, Inc., Bristol, Tenn., will be sold at auction, March 1, by the trustee under order of court. The stove plant, pump plant and real estate will be sold separately. Terms, $18,000 cash, balance 6 per cent.

The Rochester, N. Y., Railway & Light Co. recently announced that it will double the size of its plant at the foot of South Water street. The present capacity of this plant is 10,000 horsepower. The new machinery necessary has been ordered for delivery in October.

R. S. Rider, secretary of the Canada Steel & Wire Co., states that the United States Steel Corporation has taken over the Hamilton concern, and will move it to Sandwich this fall. The Steel Co. of Canada is reported as refusing to have anything to do with the United States Steel Corporation.

The partnership between James B. McCue and Joseph W. Moore, doing business under the style of West Allis Machine Co., West Allis, Wis., has been dissolved. Mr. McCue retires and the business will be continued by Mr. Moore, who accepts all liabilities and accounts receivable.

The Nova Scotia Natural Gas Co., Ltd., has applied to the Nova Scotia legislature for an act of incorporation to enable them to construct and operate works for the production and supply of natural and manufactured gas. W. B. Chandler, solicitor, of Moncton, N. B., is one of the incorporators.

Owing to the fact that a considerable number of Louisville, Ky., manufacturers, including members of the machinery trade, have developed important export business, the board of trade of that city will appoint a foreign trade committee for the purpose of co-operating with them in extending their business still further along this line.

A steady gain in the number of men employed is reported by the Milwaukee Metal Trades and Foundry Bureau to the industrial commission of Wisconsin, which is seeking periodical information as regards labor conditions. The general tone of the January reports is that employment throughout Wisconsin shows a decided improvement as compared with December.

The Car Drop Forge & Machine Tool Co., 2709 Twenty-eighth avenue, Minneapolis, Minn., has recently been organized to engage in a general drop forging business. A shop, 50 x 50 feet in size, containing a Billings & Spencer Co. 1,600-pound board drop hammer and a No. 56 Toledo trimming press, together with a couple of oil furnaces, has been established. Additional tools will be added in the future. The company also expects to engage in the manufacture of special machinery.

The Fulton Pit Car Co., Canal Fulton, O., advises that the Fulton Pit Car & Mfg. Co., whose incorporation was recently noted, has been organized to erect new buildings, buy new equipment and to erect and install the same at a given date, set approximately July 1, 1913, at which date the new company will take over all the assets and holdings of the old one. The stockholders in the former concern will, however, continue in control of the operation of the latter and the old company will continue to operate the same as usual up until the time the new one is ready to take charge.

It is announced by the Otis Elevator Co. that the Hindley Gear Co., a new incorporation, has been organized under the laws of Pennsylvania for continuing the designing and manufacturing of worm gearing of the Hindley type, which has been a branch of the business of the former company for many years. Offices of the new company are located at 1105 Frankford avenue, Philadelphia. The decision to place the gear business in the hands of a separate company has resulted from the greatly increased demand for these products, particularly from the automobile trade, in which the Hindley worm gear axles are being widely adopted for commercial trucks.

Conrad Werra, of Manitowoc, Wis., general manager of the Aluminum Castings Co., an eastern corporation with a large plant at Manitowoc, has organized the Werra Aluminum Co., of Waukesha, Wis., with an authorized capital of $110,000, and will establish a large aluminum works in the former Wisconsin Central car and machine shops, at Waukesha. With Mr. Werra there are associated A. Pankratz and E. P. Pfeffer. As the result of continual labor troubles at

Manitowoc, it was reported several months ago that the Manitowoc works of the Aluminum Castings Co. would be closed and moved to another city. In fact, options had been taken on suitable buildings in Milwaukee. Later it was stated that no removal was contemplated. However, Mr. Werra has now organized a new company, taken a long-term lease on the Waukesha shops and intends to operate on a scale as extensive as the production attained at Manitowoc.

The Harley-Davidson Motor Co., Milwaukee, has leased for three years the machine shop building at Clinton and Oregon streets, Milwaukee, until recently occupied by the Milwaukee School of Trades for Boys, and will occupy it without delay as an automatic screw machine department. The shop will be known as factory No. 7. The Harley-Davidson company has increased its floor space since Sept. 1, 1912, by 143,300 square feet of floor space, in two large structures, and a third is now under construction. Its operations have grown to such proportions, however, that it has been found necessary to lease the most suitable building outside of its own property for the automatic department until its own building operations provide the needed room. The screw department offers about 20,000 feet of space.

J. H. Plummer, president of the Dominion Steel Corporation, has purchased 45 acres on Island No. 1, Fort William, Ont., with 2,000 feet frontage on the Kaministiquia river, at a price stated to approximate $250,000. The extent of the deal has given rise to various reports and surmises as to the use to which the property is to be put, the natural conclusion being that a large industry of some kind is to be established, as such an extensive and costly site would not be required simply for a warehousing and distributing plant. It is considered likely that the Dominion Steel interests may contemplate undertaking development of the iron deposits of the neighborhood by establishing furnaces, etc., as several of the ore bodies are now being opened up under option to parties whose identity has not been divulged.

The vertical lift steel bridge, 2,100 feet long, across the city water way on Eleventh street, Tacoma, Wash., was opened recently, after about 14 months of construction work. Approximately 4,000 tons of structural steel were used, all of which was furnished by the American Bridge Co. The International Contract Co., Tacoma and Seattle, erected the bridge at the contract price, $563,000. Waddell & Harrington, Kansas City, holders of the basic patents on the vertical lift type of bridge, were employed by the city as consulting engineers. They will be paid 5 per cent of the actual cost. The lift span is 214 feet long and weighs 800 tons. It is counterbalanced by two 400-ton concrete and steel weights held in place by 64 cables an inch and a half in thickness. Two 76-horsepower motors furnish the power, but a capstan with a low gear will enable one man to raise the lift if the machinery is out of order. The floor is paved with creosoted wood blocks. The bridge has a clearance of 60 feet at high tide and with the lift raised the clearance will be 135 feet. At low tide the clearance will be 20 feet greater. The city is building a similar structure across the Puyallup river, which will cost $160,000. The Tweeden Engineering Co., Tacoma, is the contractor.

Miscellaneous

The plant of J. O'Brmams & Son, Moncton, N. B., was wrecked on Feb. 11 by an explosion of natural gas in the machine shop. The insurance amounts to $7,000, but the damage exceeds that amount considerably.

The Commercial Club, of Louisville, Ky., has started a plan to have the city issue $500,000 of bonds to be used in the construction of two market houses. Dr. H. E. Tuley is chairman of the committee in charge.

The city of Paducah, Ky., is in the market for a motor-driven pump which will be used in its sewerage system. The town will also contract for the installation of a plant for the disposal of garbage. Address the mayor.

The Henry Clay Distilling Co., Lexington, Ky., has taken over the old plant, which is being put into condition for a resumption of operations. New machinery will be needed. George C. Roberts is secretary and treasurer.

The American Creosoting Co., Louisville, Ky., is purchasing 15 pumps of various types and sizes for installation in two new plants which it is establishing. It will also buy, as soon as specifications can be prepared, retorts, storage tanks and structural material for use in building the plants.

Steel for practically rebuilding the Chicago, Rock Island & Pacific railroad from Little Rock, Ark., to Memphis, Tenn., has begun to be delivered at Little Rock. Ninety-pound rails are being laid and the line reballasted, work being carried on at several points at once.

Fires

The machine shop of the Concord & Montreal railroad at Concord, N. H., was damaged by fire recently.

The plant of the Christy Steel Co., castings, Akron, O., was seriously damaged by fire recently. The loss is estimated at $8,000.

Damage amounting to $50,000 was done to the plant of the Canadian Rubber Co., Montreal, Que., on Thursday, Feb. 13.

Fire damaged the plant of the Southern Pipe & Foundry Co., at North Birmingham, Ala., on Feb. 13. Insurance of $70,000 was carried.

Damage by fire to the foundry of McLean, Holt & Co., and the carriage factory of A. G. Edgecomb, St. John, N. B., was $1,000 to the former and $3,500 to the latter.

The Lee & Porter Mfg. Co., Buchanan, Mich., recently suffered by fire in its plant. Loss covered by insurance. The concern makes buggy, wagon and automobile axles.

Fire completely destroyed the plant of the North Atlantic Fisheries Co. at Port Hawkesbury, N. S., on Wednesday, Feb. 12. Over $200,000 insurance was carried.

A defective valve on an oil furnace at the plant of the Avery Mfg. Co., Peoria, Ill., caused fire with loss of $40,000 to the wheel house, grinding house, steel room and blacksmith shop.

The planing mill of J. J. Smith & Sons, Hamilton, Ont., was burned on Thursday, Feb. 13, and considerable machinery and lumber destroyed. The damage amounted to about $12,000.

The Maude H. mill on the Cornfield lease at Joplin, Mo., was damaged by fire last Monday. The mill has been overhauled a few weeks ago and was practically new. There was no insurance and the loss is estimated at $1,000.

A fire at Toronto, Ont., recently, destroyed the factory of the Bowman Gas Range Co. and that of the Railway Equipment Co., owned by the Canadian Malleable Steel Range Co., of Oshawa, Ont. The owner of the former will rebuild. His loss was $9,000. The loss to the other plant amounted to $16,000.

The Herzog Iron Works, St. Paul, Minn., advises that the total loss sustained by its plant by fire, on Jan. 27, noted in THE IRON TRADE REVIEW, Feb. 6, was $34,000, with insurance $18,000. The company states further that there will be some salvage, but as everything is covered by snow and ice the question of how much is problematical.